

# DRAGON USER

International edition

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December 1985

*The independent Dragon magazine*

**Two dimensional  
graphics**

**Machine code  
made simple**

**Torpedo!**

**Digital Dragons**

**WIN Microdeal's  
Trekboer!**



# DRAGON USER



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How to submit articles

The quality of the material we can publish in  
Dragon data each month will, to a very great  
extent, depend on the quality of the  
manuscripts that you can make with your  
Dragon. The Dragon computer was launched  
in the market with a powerful version of  
BASIC, but with very poor documentation.

ADVICE which we submitted to Dragon  
User has been passed on to its readers.  
ADVICE which has been passed on to its  
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couple of lines between each line. Programs  
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# Editorial

THE OFFICIAL, participation date for this magazine is November 20 — which means that you should all have read this before the 8808 Show. So you have no excuse not to go and support your machine.

If you are reading this at the 8808 Show, then you deserve praise for two reasons — firstly, having taken the trouble to show up and prove your loyalty to the Dragon, and secondly, because you've had the sense to buy Dragon User.

There will be a lot of other people at the show too. Microdata will be present in force, selling a vast number of games for the Dragon, including Mike Gernard's new ones. Treasures, Consequence will be taking up a large amount of space as well, selling amongst other things, the new 84K expansion board that can make your 84 a 128 (see Roy Cooke review). Wondersoft will be selling Jumposition, another game Mike Gernard fell over backwards about.

The list isn't endless, but there are plenty of other names as well. Cumina, Design Design, Trojan, CRL, Andak, Blady, and our very own Pam D.Arcy to name but a few.

And of course Dragon User will be there, and our roving reporters will be doing quite a lot of roving so they can write a proper show report for a future issue.

What's more, over 2,000 people, the organisers say, have already bought tickets, so it looks like it's going to be a record breaking turnout.

So just who isn't going to be there?

Well, it's unlikely that any representatives from the major high street retailers will be turning up.

Remember them? They're the people who decided the Dragon was dead, and nobody wanted to buy so many and peripherals for it any more — or so they thought. They're the reason that you have to buy anything for your Dragon by post these days, unless you're lucky enough to live near one of the small independents who really know what there's a demand for.

# Letters

This is the place for all your views — and your tips, suggestions, and comments on the magazine. Page, Dragon User, 18-19 Little Newport Street, London WC2N 7PP

## Powerless

COULD anyone at Dragon User tell me where I could purchase a transformer for my Dragon 32? I have tried Thorn master but they no longer stock it. Can the transformer be repaired or is it cheaper to buy new?

J Webb

44 Dovedale Place  
Adhurst Road  
Clarendon Heath  
Pole  
Dorset BH17 7JH

## Roll on!

I READ with interest your editorial in the October 85 issue which referred to the use of effective marketing by some companies supporting the Dragon.

For myself I own a TMS-80 Co Up 8K and I would like to see more companies placing my computer on display in shops for both companies.

In the main it is the TMS-80 that is ignored — why is this?

There are over 100 TMS-80 branches at major towns and cities in the UK alone. It must be an existing unexploited market potential for most of these companies, and with the potential at an even bigger size.

I would also like to see Dragon User printing articles for the TMS-80 (then) for this would be a regular purchase of your magazine.

W P Flannery

140 Severnside Road  
Dunington  
Rear DN46 5UT

## Pity the editor

PTY magazine Editor

Make a transfer. Make a more complex. Make it all games. Don't give us any games — only utilities! It must be worse than being the Prime Minister or Leader of the Opposition!

Editorial sympathies with G. W. Quinn (October issue), as all have to begin somewhere at sometime and I suspect it will not be very long before he might grumble that he could do with something better than this stuff (with respect to

those ads, who happens to be very interested).

I hope he is constantly keeping all his copies of Dragon User for he will ultimately find them a most useful source of reference and ideas. I have every issue since No 1, but being very short at times can rarely try a program when last published. Also I am not into games at all so do I have a disk system for offerings of this nature (as I have quoted on the November) I am very happy that other readers, interested are being covered since this makes the magazine more of a viable proposition. It would have to be far more than experience to cover merely my interests alone!

I think Dragon User continues to improve — roll on the D'Arcey, Gedge, Minikakis et al and dear Mr. Gator press! don't lower that standard but add a little on our equipment for the M. Duffers here and there.

Yes, people do type in long programs — I did Part D. Arty's Despatcher recently with much satisfaction.

D Norman Walker  
Purcell  
Mansfield

## Jet Set Willy!

I HAVE been wondering through Jet Set Willy's adventure and have found 87 rooms/scenes so far. Can anyone tell me how many there is supposed to be?

Plus, is there a cheat as in Mario Bros?

H. Jopson  
24 Albert Street  
Cardiff  
Rydeville  
Llanelli

THE NEXT issue may be of some interest to you — so should the information following it.

## Pokes!

THE following two programs will interest anyone who has purchased Jet Set Willy by Software Projects. Program A gives Willy lives and program B gives local immunity.

To use them type them in

and enter EXECUT 1. You Jet Set Willy program will then load and run as normal but without infinite lives or immunity.

If you are playing to earn points the game then has some things to be careful of. You need 100 points to finish the game and to beat.

With infinite lives, endless Pokes can occur if you die at a monster's point position. With immunity endless Pokes can occur if you fall through falling blocks in the water in the bridge.

If you go to the top of the drain, an extra item is placed in the bathroom, so don't collect too many.

Program A  
10 REM INFINITE LIVES  
EXECUT 1 TO RUN  
20 READ MPOKE, X+171  
MPOKE=X+1 IF X+15 THEN 30  
30 DATA 16,208,0,266,166  
160 148,134,125,183,43,0  
128,0,0

Program B  
10 REM IMMUNITY EXEC  
171 TO RUN  
20 READ MPOKE, X+171  
MPOKE=X+1 IF X+82 THEN 30  
30 DATA 16,208,0,266,166  
160 148,264,125,67,183,43,0  
183,43,11,247,43,28,128,0,0  
Jet Set Willy  
A/Rosmond

If the pokes don't work then you could always try the codebook which allows you access to any screen so that you can practice the game. According to Woodard, Roy Coates (where would you be without him?) the procedure is as follows:

- 1 Get the game running on any screen.
- 2 Press the M, A, and X keys at the same time.
- 3 Using the left and right arrow keys, select your screen.
- 4 Very quickly press the space bar and Minor Willy will appear in the middle of the screen.
- 5 Using the four arrow keys, position Minor Willy where you want him on screen.
- 6 Press the space bar and the game will start from that point.

Now stresses that this works on all copies of the game if it doesn't work for you, this is it! Because you've got a different version of Jet Set Willy, you aren't doing it right!

## Excellent

I HAVE been reading Dragon User since it was first published and find it an excellent magazine. Could I venture to make a suggestion just two to be exact which would both improve it?

Firstly I would find an index to topics covered in articles and the answers page (not helpful). It would save the hours of searching for the little bit of information I need. Perhaps you could give an editorial to this on say a yearly basis.

Secondly, would it be possible to publish a list of the useful POKES which have appeared from time to time in various places. I am thinking of such things as the POKES for speeding up the operation of the computer and the one to do a save. `<SHIFT>+D` in order to get tomorrow. Meanwhile keep on publishing your excellent magazine.

John Appleford  
Leamington

## Black screen

I HAVE had my Dragon 64 for eight months and although I have attempted some Basic programming, my knowledge of machine code is nil.

Regrettably I purchased the Dragon's games cassette before the issue was published in the October edition of Dragon User. Jason Ottaway's screen editor of last issue up my coat.

I have made a few minor changes, such as providing the same word being selected repeatedly in EXECUTE. However, as they all use a machine code loader I have been unable to save these changes. Is there any way I can save these programs after amending them and be able to load them again?

Also, can someone tell me if it is possible in Basic to change the standard text format to green on black as I am sure this would be better than black on green?

Alan Green  
2 Rydal Close  
Barnet Park  
Stapleford on Avon  
Warwick





## 6809 Show

THE 6809 Show looks like being the best supported event of the organisers in sight at the moment.

The list of companies attending is impressive — Microdeal, Tandy, Commodore, Camtec, Design Design, Datapac, Blaby Products, Trojan Computers, Simson, John Pons, Mike Conley, Andrea, Compimage, Quikcom, Acorn, Macromedia, Cambridge Micro-Processor, Modestsoft, Software Projects, Softers, Marple, Whitworth, Harris, Marple, Locusts, Greenway, Mocom House, Computer Bookshops, the 6809 User

Group, the 68 Micro Group and Dragon User. Just that was the list of a long while.

Congratulations to all of them for supporting the Dragon.

Design Projects also is the 2809 or so, and the Dragon owners who have apparently already booked tickets that evening at the first evening of the show.

There will be great numbers of new games and hardware on show, including Camimage's new Dragon expansion board for turn your Dragon 64 into a 128 and your 32 into a 64. Marple will be showing Justification



Impresso will have *Early Study* and Microdeal will have tonnes of new games, including *Trojan* and *Med* and *Alan*. Locusts will have

the *Dungeons* Clear expansion which gives your Dragon a BBC style interface.

If you aren't there you will have your first to come.

## Microdeal roadshow

ALL 6809 for gloom for Microdeal events following the company's recent announcement that Microdeal Pocket Money, Data Taster, Trojans, Microcom and Salesfinder products would only be available by mail order from the Cornish company's Microsoft division.

John Symes, Microdeal's managing director has coped

Radio One and organised a Microdeal Roadshow to bring his products to the public.

The Roadshow will be covering the length and breadth of England and is at 40 Wales.

On November 2 and 3 it will be at IBM CT in Sackville Street, Manchester. On November 5 and 6 at the Civil Centre Exhibition Hall

Newcastle Open Time on November 7, the Westway Hotel, Warrington Street, Leeds, on November 8, Broomfield, Aston University, Birmingham, on November 9 and 10, Sigma Hotel, Westgate Street, Cardiff.

Admission to the show is free, and there will be lots of games, many of them at bargain prices.

And don't forget that Microdeal will also be at the 6809 Show, November 25 and 26, Royal Horticultural Hall, London. You'll have to buy tickets for that though.

Write to Microdeal what about the 6809 and the 6809? International at 41 Third Floor, 38, Austin, Cornwall PL20 5UE.

## DRS Rom

OROSIGNOR Software has produced a Rom cartridge version of its database utility DRS, extending the size of database supported to 25,000 bytes, compared to 25,000 for the cassette version.

DRS was written by Mike Berry, who also wrote *Dragon's* *Address* and *Address* system.

Apparently, there are some very powerful features included — among others, and not listed among them.

DRS costs £19.95 on cassette and £19.95 on cassette.

Orsignor Software is at 2, Devon Court, South East, Sussex BN2 1J2.

## Meaning business

HARRIS Software is about to launch three new programs for Dragon 64 or Commodore 64 users. The three titles are a combination of Harris' series of programs for home and small business use.

The first title is *Stockbox*, a stock control system which can record sales, customers, orders, deliveries and supplier orders.

It can report on low stock, or items outstanding, stock valuation at cost or selling price, turnover and profit margins and a host of other things.

*Orderbook* is an invoicing program which prints invoices onto either plain or pre-printed paper. It can be linked to *Stockbox*, Harris

sales ledger program, or its *Stockbox*.

*Financebox* is a share management program, which can be used to record the details of a portfolio of stocks and shares, and plot or display valuations, capital gains, dividends and tax credits, and as an it can also show graphs of price trends.

*Stockbox* costs £19.95, *Orderbook* and *Financebox* £19.95.

Harris will be exhibiting at the first time since the Telford 6809 Show, and will have all their software on display.

Otherwise, Harris Micro Software can be contacted at 45, Alexandra Road, Newcastle, Middlesex TW9 4JH.

## Pamcomms plain

ONE OF Dragon User's best contributors, Pam O'Leary, is now the keyboard — has finally decided to make some money out of her program writing skills.

She has formed her own company — Pamcomms — dedicated to supplying low priced, high quality software for the Dragon.

The first fruits of her labours, *Pamcomms Plus* Pack, will be on view at the 6809 Show.

*Checker* is a PASCAL compiler (just editor for full source of individual applications).

characteristics editing. She plans on cassette with sample character sets, sample basic programming programs and supporting documentation. It costs just £3.95.

Also on sale at the 6809 Show from Pam will be a *Database* Pack, *Star* Pack at £1.50 and *Golden* Pack, featuring an interactive version of *Dark* Detective and a selection of other great magazine contributions at £3.00.

*Pamcomms* is located at 21 Wycombe Lane, Woodburn Green, High Wycombe Bucks HP12 3JZ.

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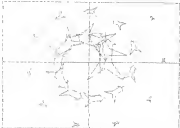


# The Dragon draws in two dimensions

*Peter Whittaker demonstrates how to get the best out of a flat surface*

THE DRAGON DRAW command is very powerful, but it does have its limitations. It is no great task to DRAW a square, and it is easy to move the square around the screen, but once complicated rotations are required, the DRAW command starts to show its limitations since objects can only be rotated in ninety degree steps. There are similar limitations with the scaling ability of the DRAW command, and so, it would not, for example, be an easy task to draw a spaceship spiralling away from a planet, and getting smaller as it went (Fig #1). To accurately move objects around in two-dimensional space, we must abandon the DRAW command in favour of a co-ordinate based system. These co-ordinates can be manipulated, and then joined together using the LINE command. This way we will be able to improve on the scaling and rotation of the DRAW command, and also add shearing and reflection to our repertoire.

The equations used to manipulate the co-ordinates are requested in the form of



matrices. This facilitates the combination of several operations into one equation. Table #1, using an anti-clockwise rotation as an example, shows how an object's co-ordinate system is multiplied with a matrix to give the object's new position. The result of the matrix manipulation is used in Listing #1 (lines 60 and 70) to

draw a rotating space ship. (Delete the REM statements in line 60 before RUN; msg.) The origin has been moved to the centre of the screen. For a smoother rotation, change the STEP value in line 130. Table #2 gives a list of all the matrices we will need for object manipulation in two dimensions.

All of the matrices in Table #2 are for operations based around the origin (co-ordinates 0,0). If we try to use them to rotate an object that is not centred on the origin, the object may not move in the way we would like. Change the 60 to: GOTO 40:40:40:40:60:60:40:40:40:40 and RUN the program again. Instead of spinning about its centre, the square will orbit the centre of the screen. If we want the square to rotate about its own centre, we must first move it to the origin, then rotate it, and then move it back.

This would take three sets of matrix multiplications to do. However, the process can be made speeded up by first combining the matrices into one compound matrix. Table #3 shows how two matrices centred on the origin and Table #4 works out the combined matrix for our square rotation program. GOTO lines 60 and 70 to: DEF (PAU2)=(X=-50/COS(THETA),Y=-50/SIN(THETA):PAU1=(X=50/COS(THETA),Y=50/SIN(THETA))-(X=50)/500:THETA=THETA+90 and RUN the program again. Now the square rotates about its

$$\begin{pmatrix} X_1 \\ Y_1 \end{pmatrix} = \begin{pmatrix} X \\ Y \end{pmatrix} \times \begin{pmatrix} A & B & C \\ D & E & F \end{pmatrix} = \begin{pmatrix} XA & XD & XC \\ YB & YE & YF \end{pmatrix}$$

$$\begin{pmatrix} X & Y \\ CO & CO \\ and & and \end{pmatrix}$$

$$(X_1, Y_1) = (XA-EB+C, XD-EB+F, XC-EB+D) \quad (C \text{ and } E = 0)$$

$$(X_1, Y_1) = (XA-EB+C, XD-EB+F)$$

$$\begin{pmatrix} X_1 \\ Y_1 \end{pmatrix} = \begin{pmatrix} X \\ Y \end{pmatrix} \times \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$$

$$= (X \cos \theta - Y \sin \theta, X \sin \theta + Y \cos \theta)$$

$$(X_1, Y_1) = (X \cos \theta - Y \sin \theta, X \sin \theta + Y \cos \theta)$$

Table 1. Object manipulation by matrix multiplication.

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$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Identity      Rotation clockwise      Reflection Horiz

$$\begin{pmatrix} X1 & 0 & 0 \\ 0 & X2 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Scaling      Rotation anticlockwise      Reflection Vert

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} X3 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Shift X      Shift Y      Translation X,Y

Table 2. Matrices for origin centered object manipulation.

$$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix} \times \begin{pmatrix} A & B & C \\ D & E & F \\ G & H & I \end{pmatrix}$$

Matrix 1      Matrix 2      Multiply each row of matrix 1 by each column in matrix 2

$$\begin{aligned} \text{Top line} &= \frac{aA+bB+cC}{dA+eE+fF} \\ \text{center line} &= \frac{gA+hH+iI}{dA+eE+fF} \\ \text{bottom line} &= \frac{cA+dD+fF}{dA+eE+fF} \\ &= \frac{aA+bB+cC}{dA+eE+fF} \end{aligned}$$

Table 3. How to multiply two matrices to get one composed matrix.

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ TX & TY & 1 \end{pmatrix} \times \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \times \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -TX & -TY & 1 \end{pmatrix}$$

Translation      Rotation      Translation

$$\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ (TX\cos\theta+TY\sin\theta-TX) & (-TX\sin\theta+TY\cos\theta-TY) & 1 \end{pmatrix} \times \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -TX & -TY & 1 \end{pmatrix}$$

Table 4. Matrix combination. Translation to origin, a rotation, a translation back.

center and does not alter the origin. The same process of matrix combination can be carried out to include scaling, shearing, reflection and variable translation. Restore the original color as commands to use AD and CONT lines AD and JS to DEF PNA(X)=X\*S \*COS(THETA)+TX \*COS(THETA)+TY \*SIN(THETA)

=Y\*SIN(THETA) and DEF PNB(Y)=X\*SIN(THETA)+Y\*S \*COS (THETA)+TX \*SIN(THETA)+TY \*COS (THETA). Add lines 125, TX=25, TY=5, S=1 and 135, S=5\*TX=TX+5 where S=the scale, TX=the translation along the X-axis and TY=the translation along the Y-axis. Now RUN the program and you will see the speechbox appear out from the center of the screen, getting smaller each time it moves until it eventually disappears from the screen (Fig #1).

## Slow

The program works well, but it is quite slow. I can be speeded up by reducing the amount of number crunching carried out instead of reading the co-ordinates from data statements each time, we can read them once in a row. Secondly I can update the co-ordinates each time we move the object, we do not need to keep an equation listing themselves every time. Instead we can use the same matrix each time on our updated co-ordinate system. Listing #2 demonstrates the increase in speed of operation using this approach, running at about twice the speed of listing #1. To help with this listing #3 when RUN will calculate the resulting matrix when two matrices are entered for multiplication. The result matrix can be used in the DEF PNA/B statements to modify the movement of an object.

## Fast

This is about as fast as we will get with "real" two-dimensional graphics with out resorting to machine code. Unfortunately, this is still not good enough for use in animation sequences. If we want faster graphics we must resort to off line animation (Listing #4). This technique involves splitting the program into two halves and running them separately. The first half does all the number crunching, it calculates the speechbox co-ordinates as it spins around the point, but instead of drawing in the subplot, the data is stored in high memory. The second half of the program then does all of the drawing. The data has been packed into high memory, and so all that needs to be done is to push the data and draw to the co-ordinates selected.

When RUN selected option #1 and the program will take several minutes to calculate the data. Eventually it will crash when the speechbox leaves the confines of the screen, and the program tries to push a number greater than 255 or smaller than 0 into memory. Run the program again, and select option #4. This will draw in the speechbox as it spins around the screen. The increase in speed is quite dramatic, with hardly a pause between each repetition of the step. The data can be saved to tape by selecting option #3 and recorded by option #2. This saves the long wait of the data calculation portion of the program. The program can be easily modified to manipulate different shapes, change the DATA lines through altered independent strings (the DEF PNA,B lines). Try it and see.

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```

8  POKED5555.0 'HIGH SPEED' FOR P
10  GOTO5555.FINITIALISE*****
20  POLD=0
30  PESTIME=0.0000
40  POLD=0 IF AC>555 THEN HUN=HUN+1
   GOTO40
50  HUN=HUN-2-1 COUNT HOW MANY SETS
   OF 50-PESTIMATES
60  DEF FARM=HUN/COSE THEN *-FARMING TH
   ERM *- ROTATION
70  DEF FARMY=HUN/COSE THEN *-FARMING TH
   ERM *- ROTATION
80  GOTO 0.40 0.50 0.6 0.7 0.8 0.9 0.0
   0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.0
   0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.0
   0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.0
90  DATA 0.00
100  *****INITIALISE*****
110  PPOD=0 1 POLD=0 PESTIME=0 1 POLD=0
   Y=0 PESTIME
120  LINE# 125.0 0-4 125 1.913 PSET LINE
   #8.913=255.93 1 PSET 12555.93
   GOTO8

```

```

139 FOR THETA=0 TO 6.3 STEP .1:PRINT
140   RT(TH)
141   COS(170-NEXT THETA
142   STOP
143   *XXXXXXXXXXXXXXXXXXXX
144   PROC4 3 POLS DRAWING SCREEN
145   LINE(0,0) TO (255,0) :PSET
146   LINE(125,0) TO (125,255) :PSET
147   RESTORE WORD:W,Y:READ CO-ORDIN
148   STOP
149   LINE(W,Y) TO (125,0) :PSET
150   LINE(125,0) TO (125,Y) :PSET :SET L=
151   ME TO START CO-ORDINATE
152   FOR A=1 TO NUM
153     READ W,Y
154     LINE(W,Y) TO (125,0) :PSET
155     LINE(125,0) TO (125,Y) :PSET
156     NEXT A
157   FOR A=1 TO 4:COPY A=4 TO A:NEXT
158   COPY TO DISPLAY SCREEN
159   RETURN
160   *COC 1985 PETER HARTMAN

```

[illegible]

```

140 H1=H2H3H4H5H6H7H8H9H10H11H12H13H14H15H16H17H18H19H20H21H22H23H24H25H26H27H28H29H30H31H32H33H34H35H36H37H38H39H40H41H42H43H44H45H46H47H48H49H50H51H52H53H54H55H56H57H58H59H60H61H62H63H64H65H66H67H68H69H70H71H72H73H74H75H76H77H78H79H80H81H82H83H84H85H86H87H88H89H90H91H92H93H94H95H96H97H98H99H100H101H102H103H104H105H106H107H108H109H110H111H112H113H114H115H116H117H118H119H120H121H122H123H124H125H126H127H128H129H130H131H132H133H134H135H136H137H138H139H140H141H142H143H144H145H146H147H148H149H150H151H152H153H154H155H156H157H158H159H160H161H162H163H164H165H166H167H168H169H170H171H172H173H174H175H176H177H178H179H180H181H182H183H184H185H186H187H188H189H190H191H192H193H194H195H196H197H198H199H200H201H202H203H204H205H206H207H208H209H210H211H212H213H214H215H216H217H218H219H220H221H222H223H224H225H226H227H228H229H230H231H232H233H234H235H236H237H238H239H240H241H242H243H244H245H246H247H248H249H250H251H252H253H254H255H256H257H258H259H260H261H262H263H264H265H266H267H268H269H270H271H272H273H274H275H276H277H278H279H280H281H282H283H284H285H286H287H288H289H290H291H292H293H294H295H296H297H298H299H300H301H302H303H304H305H306H307H308H309H310H311H312H313H314H315H316H317H318H319H320H321H322H323H324H325H326H327H328H329H330H331H332H333H334H335H336H337H338H339H340H341H342H343H344H345H346H347H348H349H350H351H352H353H354H355H356H357H358H359H360H361H362H363H364H365H366H367H368H369H370H371H372H373H374H375H376H377H378H379H380H381H382H383H384H385H386H387H388H389H390H391H392H393H394H395H396H397H398H399H400H401H402H403H404H405H406H407H408H409H410H411H412H413H414H415H416H417H418H419H420H421H422H423H424H425H426H427H428H429H430H431H432H433H434H435H436H437H438H439H440H441H442H443H444H445H446H447H448H449H450H451H452H453H454H455H456H457H458H459H460H461H462H463H464H465H466H467H468H469H470H471H472H473H474H475H476H477H478H479H480H481H482H483H484H485H486H487H488H489H490H491H492H493H494H495H496H497H498H499H500H501H502H503H504H505H506H507H508H509H510H511H512H513H514H515H516H517H518H519H520H521H522H523H524H525H526H527H528H529H530H531H532H533H534H535H536H537H538H539H540H541H542H543H544H545H546H547H548H549H550H551H552H553H554H555H556H557H558H559H560H561H562H563H564H565H566H567H568H569H570H571H572H573H574H575H576H577H578H579H580H581H582H583H584H585H586H587H588H589H590H591H592H593H594H595H596H597H598H599H600H601H602H603H604H605H606H607H608H609H610H611H612H613H614H615H616H617H618H619H620H621H622H623H624H625H626H627H628H629H630H631H632H633H634H635H636H637H638H639H640H641H642H643H644H645H646H647H648H649H650H651H652H653H654H655H656H657H658H659H660H661H662H663H664H665H666H667H668H669H670H671H672H673H674H675H676H677H678H679H680H681H682H683H684H685H686H687H688H689H690H691H692H693H694H695H696H697H698H699H700H701H702H703H704H705H706H707H708H709H710H711H712H713H714H715H716H717H718H719H720H721H722H723H724H725H726H727H728H729H730H731H732H733H734H735H736H737H738H739H740H741H742H743H744H745H746H747H748H749H750H751H752H753H754H755H756H757H758H759H760H761H762H763H764H765H766H767H768H769H770H771H772H773H774H775H776H777H778H779H780H781H782H783H784H785H786H787H788H789H790H791H792H793H794H795H796H797H798H799H800H801H802H803H804H805H806H807H808H809H810H811H812H813H814H815H816H817H818H819H820H821H822H823H824H825H826H827H828H829H830H831H832H833H834H835H836H837H838H839H840H841H842H843H844H845H846H847H848H849H850H851H852H853H854H855H856H857H858H859H860H861H862H863H864H865H866H867H868H869H870H871H872H873H874H875H876H877H878H879H880H881H882H883H884H885H886H887H888H889H890H891H892H893H894H895H896H897H898H899H900H901H902H903H904H905H906H907H908H909H910H911H912H913H914H915H916H917H918H919H920H921H922H923H924H925H926H927H928H929H930H931H932H933H934H935H936H937H938H939H940H941H942H943H944H945H946H947H948H949H950H951H952H953H954H955H956H957H958H959H960H961H962H963H964H965H966H967H968H969H970H971H972H973H974H975H976H977H978H979H980H981H982H983H984H985H986H987H988H989H990H991H992H993H994H995H996H997H998H999

```

```

18 C1=PRINT A D G      B C E
20 PRINT D E H      C F H
30 PRINT C F I      C F I
40 PRINT MATRIX I,      I
50 STOP N-1 TO C
60 PRINT C1=C2=C3=C4=C5=C6=C7=C8=C9=C10=C11=C12=C13=C14=C15=C16=C17=C18=C19=C20=C21=C22=C23=C24=C25=C26=C27=C28=C29=C30=C31=C32=C33=C34=C35=C36=C37=C38=C39=C40=C41=C42=C43=C44=C45=C46=C47=C48=C49=C50=C51=C52=C53=C54=C55=C56=C57=C58=C59=C60=C61=C62=C63=C64=C65=C66=C67=C68=C69=C70=C71=C72=C73=C74=C75=C76=C77=C78=C79=C80=C81=C82=C83=C84=C85=C86=C87=C88=C89=C90=C91=C92=C93=C94=C95=C96=C97=C98=C99=C100=C101=C102=C103=C104=C105=C106=C107=C108=C109=C110=C111=C112=C113=C114=C115=C116=C117=C118=C119=C120=C121=C122=C123=C124=C125=C126=C127=C128=C129=C130=C131=C132=C133=C134=C135=C136=C137=C138=C139=C140=C141=C142=C143=C144=C145=C146=C147=C148=C149=C150=C151=C152=C153=C154=C155=C156=C157=C158=C159=C160=C161=C162=C163=C164=C165=C166=C167=C168=C169=C170=C171=C172=C173=C174=C175=C176=C177=C178=C179=C180=C181=C182=C183=C184=C185=C186=C187=C188=C189=C190=C191=C192=C193=C194=C195=C196=C197=C198=C199=C200=C201=C202=C203=C204=C205=C206=C207=C208=C209=C210=C211=C212=C213=C214=C215=C216=C217=C218=C219=C220=C221=C222=C223=C224=C225=C226=C227=C228=C229=C230=C231=C232=C233=C234=C235=C236=C237=C238=C239=C240=C241=C242=C243=C244=C245=C246=C247=C248=C249=C250=C251=C252=C253=C254=C255=C256=C257=C258=C259=C260=C261=C262=C263=C264=C265=C266=C267=C268=C269=C270=C271=C272=C273=C274=C275=C276=C277=C278=C279=C280=C281=C282=C283=C284=C285=C286=C287=C288=C289=C290=C291=C292=C293=C294=C295=C296=C297=C298=C299=C300=C301=C302=C303=C304=C305=C306=C307=C308=C309=C310=C311=C312=C313=C314=C315=C316=C317=C318=C319=C320=C321=C322=C323=C324=C325=C326=C327=C328=C329=C330=C331=C332=C333=C334=C335=C336=C337=C338=C339=C340=C341=C342=C343=C344=C345=C346=C347=C348=C349=C350=C351=C352=C353=C354=C355=C356=C357=C358=C359=C360=C361=C362=C363=C364=C365=C366=C367=C368=C369=C370=C371=C372=C373=C374=C375=C376=C377=C378=C379=C380=C381=C382=C383=C384=C385=C386=C387=C388=C389=C390=C391=C392=C393=C394=C395=C396=C397=C398=C399=C400=C401=C402=C403=C404=C405=C406=C407=C408=C409=C410=C411=C412=C413=C414=C415=C416=C417=C418=C419=C420=C421=C422=C423=C424=C425=C426=C427=C428=C429=C430=C431=C432=C433=C434=C435=C436=C437=C438=C439=C440=C441=C442=C443=C444=C445=C446=C447=C448=C449=C450=C451=C452=C453=C454=C455=C456=C457=C458=C459=C460=C461=C462=C463=C464=C465=C466=C467=C468=C469=C470=C471=C472=C473=C474=C475=C476=C477=C478=C479=C480=C481=C482=C483=C484=C485=C486=C487=C488=C489=C490=C491=C492=C493=C494=C495=C496=C497=C498=C499=C500=C501=C502=C503=C504=C505=C506=C507=C508=C509=C510=C511=C512=C513=C514=C515=C516=C517=C518=C519=C520=C521=C522=C523=C524=C525=C526=C527=C528=C529=C530=C531=C532=C533=C534=C535=C536=C537=C538=C539=C540=C541=C542=C543=C544=C545=C546=C547=C548=C549=C550=C551=C552=C553=C554=C555=C556=C557=C558=C559=C560=C561=C562=C563=C564=C565=C566=C567=C568=C569=C570=C571=C572=C573=C574=C575=C576=C577=C578=C579=C580=C581=C582=C583=C584=C585=C586=C587=C588=C589=C590=C591=C592=C593=C594=C595=C596=C597=C598=C599=C600=C601=C602=C603=C604=C605=C606=C607=C608=C609=C610=C611=C612=C613=C614=C615=C616=C617=C618=C619=C620=C621=C622=C623=C624=C625=C626=C627=C628=C629=C630=C631=C632=C633=C634=C635=C636=C637=C638=C639=C640=C641=C642=C643=C644=C645=C646=C647=C648=C649=C650=C651=C652=C653=C654=C655=C656=C657=C658=C659=C660=C661=C662=C663=C664=C665=C666=C667=C668=C669=C670=C671=C672=C673=C674=C675=C676=C677=C678=C679=C680=C681=C682=C683=C684=C685=C686=C687=C688=C689=C690=C691=C692=C693=C694=C695=C696=C697=C698=C699=C700=C701=C702=C703=C704=C705=C706=C707=C708=C709=C710=C711=C712=C713=C714=C715=C716=C717=C718=C719=C720=C721=C722=C723=C724=C725=C726=C727=C728=C729=C730=C731=C732=C733=C734=C735=C736=C737=C738=C739=C740=C741=C742=C743=C744=C745=C746=C747=C748=C749=C750=C751=C752=C753=C754=C755=C756=C757=C758=C759=C760=C761=C762=C763=C764=C765=C766=C767=C768=C769=C770=C771=C772=C773=C774=C775=C776=C777=C778=C779=C780=C781=C782=C783=C784=C785=C786=C787=C788=C789=C790=C791=C792=C793=C794=C795=C796=C797=C798=C799=C800=C801=C802=C803=C804=C805=C806=C807=C808=C809=C810=C811=C812=C813=C814=C815=C816=C817=C818=C819=C820=C821=C822=C823=C824=C825=C826=C827=C828=C829=C830=C831=C832=C833=C834=C835=C836=C837=C838=C839=C840=C841=C842=C843=C844=C845=C846=C847=C848=C849=C850=C851=C852=C853=C854=C855=C856=C857=C858=C859=C860=C861=C862=C863=C864=C865=C866=C867=C868=C869=C870=C871=C872=C873=C874=C875=C876=C877=C878=C879=C880=C881=C882=C883=C884=C885=C886=C887=C888=C889=C890=C891=C892=C893=C894=C895=C896=C897=C898=C899=C900=C901=C902=C903=C904=C905=C906=C907=C908=C909=C910=C911=C912=C913=C914=C915=C916=C917=C918=C919=C920=C921=C922=C923=C924=C925=C926=C927=C928=C929=C930=C931=C932=C933=C934=C935=C936=C937=C938=C939=C940=C941=C942=C943=C944=C945=C946=C947=C948=C949=C950=C951=C952=C953=C954=C955=C956=C957=C958=C959=C960=C961=C962=C963=C964=C965=C966=C967=C968=C969=C970=C971=C972=C973=C974=C975=C976=C977=C978=C979=C980=C981=C982=C983=C984=C985=C986=C987=C988=C989=C990=C991=C992=C993=C994=C995=C996=C997=C998=C999=C1000=C1001=C1002=C1003=C1004=C1005=C1006=C1007=C1008=C1009=C1010=C1011=C1012=C1013=C1014=C1015=C1016=C1017=C1018=C1019=C1020=C1021=C1022=C1023=C1024=C1025=C1026=C1027=C1028=C10
```

```

      *S NEXT S
      DO PRINT=PRINTON 2.....
      GO TO 900 IF S EQ 0
      DO PRINT=PRIN 2S+1.....          PRINT=PRIN
    = 0 NEXT S
    IF T EQ 0 THEN GOTO 1000 ELSE GOTO 900

```

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1.35  $\text{Pb}(\text{CH}_3\text{COO})_2 + \text{H}_2\text{O} \rightleftharpoons \text{Pb}(\text{OH})_2 + 2\text{CH}_3\text{COOH}$   $K = 2.0 \times 10^{-5}$

1.36  $\text{Pb}(\text{CH}_3\text{COO})_2 + 2\text{H}_2\text{O} \rightleftharpoons \text{Pb}(\text{OH})_2 + 2\text{CH}_3\text{COOH}$   $K = 4.0 \times 10^{-5}$

1.37  $\text{Pb}(\text{CH}_3\text{COO})_2 + 2\text{H}_2\text{O} \rightleftharpoons \text{Pb}(\text{OH})_2 + 2\text{CH}_3\text{COOH}$   $K = 4.0 \times 10^{-5}$

1.38  $\text{Pb}(\text{CH}_3\text{COO})_2 + 2\text{H}_2\text{O} \rightleftharpoons \text{Pb}(\text{OH})_2 + 2\text{CH}_3\text{COOH}$   $K = 4.0 \times 10^{-5}$

1.39  $\text{Pb}(\text{CH}_3\text{COO})_2 + 2\text{H}_2\text{O} \rightleftharpoons \text{Pb}(\text{OH})_2 + 2\text{CH}_3\text{COOH}$   $K = 4.0 \times 10^{-5}$

```

190 PRINTTAB(20,30,5,100,7,140,5,180,5,220)
200 PRINTTAB(20,30,5,100,7,140,5,180,5,220)
210 PRINTTAB(20,30,5,100,7,140,5,180,5,220)
220 END

```

LISTING #4:  
OFF THE BEAT

```

10 CLEAR200,20000 'PROTECT MEMORY P
   OR CLR#17 DATA
15 AOS200+495 0
20 '*****INITIALIZATION*****
40 POLSOP
50 RESTORE HUP-0
60 READ A IF A<000 THEN HUP=HUP+1
   GOTO0
70 HUP=HUP+2: '***** OF CO-ORDINATE
   YES
80 CLS PRINT#1 "SPACESHIP" PRINT P
   RIGHT=SELECT CHOICE -> "PRINT"...
   .CALCULATE DATA PRINT#2...SAVE
   DATA PRINT#3...LOAD DATA PRINT
   #4...RUN DATA
90 INPUT PROMPT A GOTO 120 200,400,600,800
   0
100 GOTO 00
110 *****CALCULATE DATA*****
120 DEF FNR(X)=X*ASIN(COS(THETA)+Y*ASIN(CO
   S(THETA)-Y*ASIN(CO(THETA)+Y*ASIN(CO
   S(THETA)+125
130 DEF FNR(Y)=X*ASIN(CO(THETA)+Y*ASIN(CO
   S(THETA)-Y*ASIN(CO(THETA)+Y*ASIN(CO
   S(THETA)+40
140 T*2000 TY=100 0=1 'TRANSLATION IN
   LONG ONLY DATA=0*SCALE
150 'DATA 0 -40,10,10,10,10,10,0,30,
   -30,0,-10,-30,-30,-10,0,-10,30,-
   10,30,0,-40,0,50
160 DATA 200
170 BYTE=20000: 'PROTECTED MEMORY
180 END: T*1000 0 TO 50 STEP .1: T*1000

```

```

1000 1000 STEP
1001 1001 S=0.00 TM=TV+.01 'SARINK RATE S
1002 1002 SPINRL RATE
1003 1003 NEXTDRC
1004 1004 FOR A=0 TO 400
1005 1005 R=0 Y
1006 1006 PC=PE BYTE=FARX*3+PORG BYTE=1,PH
1007 1007 BY Y BYTE=BYTE+2 'SAVE UPDATED
1008 1008 CO=CO+1/4*1/4
1009 1009 CONTINUE
1010 1010 NEXT R,THEIR
1011 1011 GOTO00
1012 1012 '*****000000 *****
1013 1013 BYTE=00000
1014 1014 PORG4.1 SCREEN1.0
1015 1015 PORG4.5+POLS
1016 1016 LINE0.0,01 '000,01,1,POST LINE0.1
1017 1017 0,0,1,20,10,1,POST
1018 1018 LINE0.PORG BYTE> PORG4.BYTE+1,0=0
1019 1019 PORG BYTE> PORG4.BYTE+1,1,POST
1020 1020 BYTE=BYTE+2
1021 1021 FOR A=1 TO 400
1022 1022 LINE-(PORG BYTE> PORG4.BYTE+1),1,
1023 1023 POST BYTE=BYTE+2,NEXT A
1024 1024 FOR A=1 TO 4 COPY A+4 TO A,NEXT
1025 1025 T
1026 1026 GOTO 000 'LOOP
1027 1027 STOP
1028 1028 COPY'DIRECTORY' PORG00 00000 0
1029 1029 PORG00
1030 1030 CLASH'DIRECTORY' GOTO00
1031 1031 PORG 0000, PORG 000000

```

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## References

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**Abstract**



GROSVENOR SOFTWARE

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A. PROPOSED CHANGES TO CURRENT TITRATION PROCEDURE — (continued)

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 1980 model car. 1980 F100. 1980 F100.

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Abstract: The purpose of this study was to determine the effect of a 12-week training program on the physical fitness and health of sedentary middle-aged men. The subjects were 20 men, aged 40-50 years, who were sedentary and had no history of cardiovascular disease. They were randomly assigned to either a control group (n=10) or a training group (n=10). The training group participated in a 12-week program of aerobic exercise, three times per week, for 45 minutes per session. The control group did not participate in any exercise program. Physical fitness was assessed at baseline and at 12 weeks using a variety of tests, including a maximal aerobic capacity test, a submaximal aerobic capacity test, and a resting heart rate test. Health was assessed at baseline and at 12 weeks using a variety of tests, including a blood pressure test, a cholesterol test, and a glucose test. The results of the study showed that the training group had significantly higher values for all physical fitness and health measures at 12 weeks compared to baseline and compared to the control group. The control group had no significant changes in any of the measures. The results of this study suggest that a 12-week training program can improve physical fitness and health in sedentary middle-aged men.

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# Machine code made simple

Ray Collinside with some sample machine code routines

HAVING WRITTEN a machine code routine for the ZX81 screen (also wanted to include some little PRINTING or POKing from BASIC using undesirable in this case) the paucity of **ASCII FORM CHARACTERS** was the obvious restriction to use (but the problem was in retrieving the characters stored in memory and POKing them to the screen).

The immediate requirement seemed to be to get pointers to a memory location, store the contents in a register then send it to the screen.

The ACCUMULATOR-OFFSET INSTRUCTION method seemed most appropriate in pointing in and releasing from memory any characters stored there by the PCO instruction. Using both accumulators, it is written #LDA 0 Y4. This means take the current value held in the Y register, add it to the address held in the Z register, and store the address to the A accumulator ready to POINT on the screen.

Enter keying of 1 and when assembled COME, a copy before Exliciting. If you are uncertain about the location of lines 180 and 280 (date or REM each line) or possible and REM.

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system's nesting of the *Crackles* disk space. What you should know is the Dragon's disk space. We are in effect POCHING data to memory and somewhere is no CHRIS equivalent to POCH (see *Introducing Dragon Machine Code* Pg 88-87 by Ian Sordani). The Dragon gives an inverted space. The report that we need to change the data stored in the A number.

It's straightforward of course that numbers are stored and used in binary form. For a space, we have written a regular hex 30-decimal 32, or in binary 01100000. The number that the DRAGON requires is binary 01, or in binary 01100000, which is the PASCAL equivalent of CHINESE 32. The INCLUSIVE-OR operation returns a 1 if either one of the operands is a 1. So if we have 01100000 and 01100000,

We get

$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

in other words, we find 0 in the  $A$  sequence.

The comments in listing d) should adequately explain the remainder of the revision.

business and industry in strategic relations

method in lines 105 onwards. Line 105 LEAK LOAD EFFECTIVE ADDRESS A sets 40 to the X register and sets up the video memory address where the next line of data is to be displayed. Line 106 VIDE0 is the line character in the case space; the data in the Y register is LOADED into the A accumulator and the Y register is then incremented. This is rather a laborious method but demonstrates how registers can be manipulated.

Listing #3 illustrates the first test line, so it is not necessarily as scary. Ourilly operations on the operands, equivalent to what the test was used to report for it. To see why that is, no longer into listing #7 FOR A LINE OF TEST, as well as several operations.

To reveal this, we need to carry out an EXCLUSIVE OR operation on the A register. The EOR returns a 1 if one bit only one of the operands is a 1. Now the ASCII code for A is binary 88 (in binary 01000100) and for A inverted which is what we want is 01000011, so if we EOR A which contains 88 with 84, we reveal the bit, as we can see:

**DE GRUYTER**

The remainder of the program followed the same sequence as the previous sessions.

Listing 14 was originally a subroutine and so the register values had to be preserved, but on its own the PCARS and PARS instructions can be left out.

The first test line is diverted by the program but by calling the routine `field` in `HEAD` at address `5854A`, you can enter line in `SHIFT` mode. This is an implementation of `PRINT` routine if you use the `SHIFT` mode the spaces between words will be compressed to a minimum in the print

| A. 自然语言描述： (10 分) |  |
|-------------------|--|
| 1. 问题描述           | 某公司生产的产品，其质量与成本之间的关系如下：  |
| 2. 输入数据           | 输入数据为产品的成本，范围在 100 到 1000 之间。  |
| 3. 输出数据           | 输出数据为产品的质量，范围在 1 到 10 之间。  |
| 4. 算法描述           | 算法描述为：根据成本计算质量。计算公式为：<br>$Q = \frac{C}{100} \times 10$ 其中，Q 为质量，C 为成本。 |
| 5. 流程图            | 流程图描述为：开始 -> 输入成本 C -> 计算质量 Q -> 输出质量 Q -> 结束。                         |
| 6. 测试数据           | 测试数据为：成本 100，质量 1；成本 1000，质量 10。                                       |
| 7. 总结             | 总结为：该算法简单易懂，易于实现。  |

|         |      |
|---------|------|
| 1. 研究目的 | 研究目的 |
| 2. 研究背景 | 研究背景 |
| 3. 研究意义 | 研究意义 |
| 4. 研究内容 | 研究内容 |
| 5. 研究方法 | 研究方法 |
| 6. 研究结果 | 研究结果 |
| 7. 研究结论 | 研究结论 |
| 8. 参考文献 | 参考文献 |
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This month we take a look at the graphics and sound routines of the Dragon's ROM. These can be profitably used in machine code programs for setting up electronic displays and for playing music, but for fast action games customised routines will be needed.

## Graphics and Sound Memory Map

The following decimal addresses are those used by the graphics and sound commands on the Dragon and Tandy machines.

|         |   |
|---------|---|
| 124     | Data for low-res GETRESET routine   |
| 176     | Current background colour in use  |
| 178     | Current background colour in use  |
| 188     | Temporary colour in use (colour given as parameter in command to override default settings) |
| 181     | Byte value for current colour (the value played at 1 byte to set all points in that colour) |
| 182     | Pinch graphics mode number in use   |
| 183/184 | Address of the first byte of the current graphics display                                   |
| 185     | Number of bytes used per line in current graphics mode                                      |
| 186/187 | Address of the first byte of the current graphics display                                   |
| 188     | Start of graphics pages (PAGE0) Defaults to 186 in address 1838 — changed by DRAGON etc.    |
| 189     | Current X cursor position — not user available  |
| 191     | Current Y cursor position — not user available  |
| 192     | Colour set currently in use   |
| 194     | Plot/Unplot flag (0=erase, not zero=plot)   |
| 195/196 | Current horizontal pixel number   |
| 197/198 | Current vertical pixel number   |
| 199/200 | Current X cursor co-ordinate  |
| 201/202 | Current Y cursor co-ordinate  |
| 203/204 | Color command 0 co-ordinate   |
| 205/206 | Color command 1 co-ordinate   |
| 208     | Color Radius  |
| 210     | Current angle to be used in DRAM routines   |
| 212     | Current scale to be used in DRAM routines   |
| 140     | Sound pitch value   |
| 222     | Current Octave in use (0-4)   |
| 223/224 | Volume data for current volume setting in PLAY routines                                     |
| 225     | Current note length for PLAY routines   |
| 226     | Current tempo for PLAY routines   |

## Graphics and Sound Firmware Routines

The following ROM routines can be used from machine code programs. The details of various commands like color and plot are not given as they cannot easily be used as stand alone routines, but see the DRAM routine.

**Set VDG Mode**  
**Dragon 43100 Tandy 38286**  
 Sets the VDG into the mode given at the B register. The mode will be (default) in recursive.

**Set VDG Offset**  
**Dragon 43421 Tandy 38415**  
 Sets the display offset for a graphics mode. 0-1023 is display at address 1538 (the A register would contain it on entry. This routine also takes account of data etc. so the same result will not occur if data is attached — if A=0 then the display will start at graphics page 1, wherever that is.

**Select Page**  
**Dragon 43486 Tandy 38482**  
 On entry the B register contains the Pinch page number to be used in subsequent graphics routines.

**Select Color Set**  
**Dragon 43539 Tandy 38535**  
 Selects either color set zero or one depending on the value of the B register on entry.

**Select VDG Color**  
**Dragon 43638 Tandy 38632**  
 Selects the required VDG colour set from the data in location 193.

**Set Colors**  
**Dragon 43694 Tandy 38690**  
 Sets up the locations 180 & 181 with the data in locations 184 and 185 (see Memory Map for details).

**Select Display**  
**Dragon 43739 Tandy 38734**  
 Selects either TEXT or GRAPHICS modes depending on the X condition code (0-1). From text, also sets up a display in current Pinch location 182, clearing it at the address in locations 195/197.

**Reserve HWG RAM**  
**Dragon 43855 Tandy 38848**  
 Reserves RAM for graphics and moves Basic program if necessary. The B register holds the number of pages to be reserved — or the routine does a PCLERA.

**Clear Graphics**  
**Dragon 43937 Tandy 38930**  
 Clears the current graphics screen to the data in the B register on entry.

**Clear Pixel Pos**  
**Dragon 47666 Tandy 43262**  
 On entry the top of stack must contain the low res vertical co-ordinate, provided by the horizontal co-ordinate. On entry the X register contains the address of the byte containing the low res pixel and location 184 will contain the OR data for the pixel.

**Set LRG Pixel**  
**Dragon 47883 Tandy 43448**  
 On entry the X register contains the screen address, the B register the colour and location 184 the OR data. The Pixel will be placed on the low res screen.

**Reset LRG Pixel**  
**Dragon 47920 Tandy 43485**  
 As for Set LRG Pixel above, except the B register is ignored and the pixel is reset to black.

**DRAW**  
**Dragon 48137 Tandy 43618**  
 This routine allows access to all the facilities of the DRAM command. Its use is as follows. On entry location 188/187 must point to a string of characters consisting of normal Pinch commands, the first character must be color 04, and the last must be code 0. The A register should also contain 24 on entry.

**Enable Sound**  
**Dragon 47715 Tandy 43362**  
 Enables 8 bit sound by setting bit 3 of the hardware local in 65215.

**Disable Sound**  
**Dragon 47811 Tandy 43360**  
 Disables 8 bit sound by clearing bit 3 of the hardware location 65215.

**Beep**  
**Dragon 47776 Tandy 43345**  
 This routine sounds a beep for the length held in the B register. The pitch is set by location 140.

**Play Note**  
**Dragon 48885 Tandy 39675**  
 The A register contains the note code of the note to be played. The sample octave tempo, volume and note length settings should be set up in memory before entry (see Memory Map for details). Sound must be enabled before calling this routine (see Enable Sound routine).

Through the fourth in Brian's series on the Dragon's Rom routines, Next month he will be covering Basic variables.

If you have missed any of the previous issues you can get them from Dragon User at £1.25 each including postage, packing and administration charges.

# TOTAL

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# Fire torpedo one!

*Steve Gathercole shows you how to re-create  
a classic game from the archives*

The idea of this game is based on an old arcade classic in which you have to torpedo passing ships on the horizon. The game lets you define your own hit key each time you play and uses some nice smooth graphics.

To type in this game proceed as follows. First type in LISTING 1. This is the basic program which draws the simple background — the machine code does the rest of the graphics. When run, the screen display looks pretty nice, but at the start of

your tape using OSAYEM, SCORP, 1838,2879,6144. Next switch the computer off and on again, then type in LISTING 2. This is the loader for the machine code. When run the program will ask you for the start address. This is the hit hand column — a 20000 Hex type is the string of ten digits (the middle column), and then the checksum (the right hand column). Continue this until the program says, this is all, then type OSAYEM, GAMC, 20000,6146,66,20000, after the

previously stated SCORP. To run the game type CLOADM-CLOADM-EXECUTE or, if you want to store both parts as one game, load both parts into the memory (50K) using the whole thing using SCAYEM, GAMC, 1000,6146,66,20000 — then just use EXECUTE to run the loaded game.

If you have any problems then contact me at 14 Haskinsley, Exeter, Devon EX4 3JH or Andrew Muehlen, Centre for Science and

## LISTING 1

```
10 PMODE 3,1,SCREEN 1,9-PCLS
20 CIRCLE 1127,979,130,4
30 PPOINT 12,20,4,4
40 PPOINT 12,1920,4,4
50 PPOINT 1253,20,4,4
60 PPOINT 1253,1920,4,4
70 COLOR 1
80 LINE 68,68-1254,141,PSET,BF
90 COLOR2-LINE 68,68-1254,141,PSET,
0
100 LINE 6136,68-6136,141,PSET
110 COLOR 3-LINE 62,19-1253,134,PSE
120 COLOR 1
130 LINE 68,68-10,1861,PSET
140 LINE 6254,685-6254,1861,PSET
150 COLOR 6-LINE 68,979-1254,979,P
160 PPOINT 125,1865,3,4
170 GOTO 170
```

## LISTING 2

```
10 CLS
20 REM HELDAGER - ENTER THE
30 REM STRING OF HEX DIGITS FIRST
40 REM AND THEN THE CHECKSUM
50 CLEAR200,10000
60 PRINT ENTER START ADDRESS :INP
UT START
70 PRINT ENTER FINISH ADDRESS :IN
PUT FINISH
80 FOR N=START TO FINISH STEP 11
90 PRINTN,
100 TT=INP INPUT AND Z=0
110 FOR G=1 TO LEN(ND) STEP 2
120 P=VAL C$H +16*(H$G,2)
130 TT=TT+P-POKE 6N+25,P
140 Z=Z+1-NEXT
150 PRINT =
160 INPUT T$
170 IF T$ <=>CHECKS(TT) THEN SOUND 20
-30-PRINT ERROR - ENTER LINE AGAIN
-60TO 100
180 NEXT
```

## LISTING 3

```
20000 505456565656565656565656 = 355
20011 4015400016554015400000 = 17F
20022 4000400017501540001000 = 10A
20033 1000101500154001005540 = 10F
20044 4000401015540000554000 = 24A
20055 6015501554000015400010 = 16E
20066 5540001000100550001000 = 26A
20077 101540001000100010101540 = 1AA
20088 555000500050005000500015 = CE
20099 5040001540001015401540 = 10E
20110 4010001000101540050015 = 15E
20121 0005000500154015400010 = 104
20132 0040100055501540001005 = 1A0
20143 4040101540050011005550 = 1A0
20154 01000540555004000554000 = 1C0
20165 5055401554000055400010 = 22C
20176 154055500000100000010 = 10E
20187 0015400010154000101540 = 190
20198 1540001015400010554000 = 190
```

*Continued next*

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IT'S WELL over twelve  
months now since Winterton's  
last Dragon adventure, *Return  
of the Hag*, but the time  
has well spent judging by the  
quality of their new magi title,  
*Juxtaposition: Director of Cos-  
play*.

Rate of their earlier quests  
may or may not be designed  
to keep that first quest a magi  
at night in his new one, it's a  
completely fresh story — well,  
fresh to Dragon adventures.  
Though players with access to  
other machines might feel re-  
sentment to adventures  
such as *Blackwell Manor* to  
discover most of *Return of the  
Hag*, you, say, all  
the way on a Dragon? Almost.  
As the program must be a mas-  
terpiece of compression with  
its subsidiary programs to  
love as has happened in the  
past.

You see *Cosplay* — it's not  
because you've taught the  
adventure that it happens  
to be your name, and you live  
on the planet Cal V as a fairly  
low grade service: the planet  
being split into upper-cord  
sections and each one ruled  
by the appropriate Baron. You  
and a few million others are  
assigned to Baron White, living  
in a dented city in the middle  
of the lands.

The game begins with you  
waking in your tiny, poorly  
decorated apartment, a sort of  
Celtic Victorian flat, with  
cavernously the bare minimum  
for a happy existence: a bed  
and a telephone. A message  
comes through on the tel-  
phone, the equivalent of a  
Royal summons: as Baron  
White himself, sending you in  
a suicide mission to the lands  
of Baroness Black to find out  
why she hasn't attended the  
late baron's coronation and  
discovered she's got her hands  
on the secret of Juxtaposition,  
enabling her to cross the line  
of dimensional intertidal  
which passes right through  
Cal V. Got that? Right off you  
go.

As you're undertaking this  
mission on behalf of the Baron  
himself, you'd think he'd give



you a bit of compensation and  
asked you should find a way  
down which are passing the  
barons outside your apart-  
ment, but no, you have to deal  
with them first, but that's not  
too difficult with a little careful  
observation of their movement  
patterns. This first section is  
basically a test adventure  
with a small portion of the  
dented city in the upper right  
of the screen. They had been  
redecorated for colour  
mating and a more attractive  
layout and occupies the bot-  
tom half of the screen.

## Superior

Examine every object you  
can find you should find a way  
of getting down to a slightly  
superior set of apartments be-  
low yours, and a you can deal  
with the painting droid then  
you get yourself a blue key  
and allowing you to break the  
locked door that lead to the  
city itself.

Almost immediately you  
come across an airlock  
though something tells me it's  
not what to stop I though here  
just left. Winterton's ruling the  
Endless Red Zone for a  
while convinced me I was  
heading nowhere fast but at  
last finding a resource I was  
able to travel to four different  
parts of the city, at one of  
which was an ultra-modern  
Lazerlaser with a jet saying  
Let's Dance. After unpleasant  
Terror Tactics and being re-  
suscitated of missing injuries  
suggestions I left her for a  
while and explored elsewhere.  
This led to me finding a  
broader task, at which I  
cashed for the airlock and

found myself outside the  
dented city.

Out on the surface of the  
planet, that the game switches  
to is a Land of Mithril  
landscape style at game  
though you're still entering the  
concrete, undergrowth.  
The top half of the screen shows  
your current view and you  
can look at any of the eight  
compass directions, with the  
up arrow key moving you for-  
ward in the direction you're  
facing. The speed with which  
your viewpoint changes is in-  
crease, but even then  
Land of Mithril I would say  
and you can affect around the  
landscape — graphics have  
obviously been kept simple  
and you do notice slight dis-  
placement of mountains and  
forests here and there, but the  
detail is caused from the very  
impressive effects. Don't  
worry, you'll find quickly  
though I set off in one direc-  
tion and found myself in the  
land of Baron Black unable to  
get back again before I was  
spoiled by the Baron's Chap-  
lain. Not being able to turn  
the appropriate ID card I was  
disappointed without remedy. Come  
you Red Baron!

Thanks to the SAVES facility I  
returned to Baron White's city  
then and made sure I played  
there. I found a system where  
I was able to enter, but the  
only thing inside was a wide  
cavern leading nowhere, so  
that's a shame. To come back  
to later I eventually found a  
baron's estate which was a maze  
of paths, not in memory over-  
sight electronic you watch  
ing the baron at last I made  
contact with the Baron him-  
self, who gave me a red ID  
Tag. Scouring through the  
Red Baron's lands I found  
another gemstone tower and  
eventually a dented city sur-  
rounding a remarkable resemblance  
to the white one I'd left in fact  
it was identical, almost but  
it did give me chance to make  
up on food from the dented  
droid and restore my health by  
a sea table — you have to quit  
once a day with *ACCORD*,  
showing you not just what  
percentage of the game you've  
done, but your current  
ball of health.

Out again on to the planet, I  
obviously had to find the home  
of Baron Red, but such is my  
luck I wandered off into Baron  
Baron's lands and was in-  
duced to a pile of extraordinary

advantage get again. All this  
playing and still only 50% com-  
pleted. Mapping the planet's  
surface is a tricky business, as  
there are apparently 4,000  
locations, and of course you  
can move off in any one of  
eight directions from most of  
them. The exceptions being  
the mountains which border  
the map. You have to really  
keep your eyes open and try  
to spot potentially interesting  
buildings in the distance that  
lead for there. If you want to  
map the lot properly I do sug-  
gest you go out and buy your-  
self a roll of wall paper.

## Complex

As if 30,000 waypoints  
were enough the next piece  
is equally complex, dealing  
with long sentences — you  
occasionally having trouble with  
shorter ones sometimes. You  
have to try several variations  
on a command to get upon the  
right combination of words.  
You can also speak to other  
characters using question  
marks, such as BAR TO CHA-  
NCE DROG, BARBARAGE  
DROG AND CHINE PHASE.  
As well as get them to carry  
things for you, but as yet I've  
only found the ultra-operative  
girl and a few droids so I must  
be missing most of this skill to  
some.

After a couple of days, play-  
ing the adventure itself looks like  
it's going to be fairly straight-  
forward, and possibly a little  
repetitive — I sincerely hope  
that when I get to the Red  
Baron he isn't going to give  
me a Brown ID Tag, which I  
then take to the Green Baron  
etc. But I still have a few  
objects I haven't yet been able  
to make use of so maybe I'll  
get more complicated than  
this. And I've also found the  
apparent anomaly of no cities  
is going to be disruptive. Apart  
from these slight reservations,  
then I do say *Juxtaposition*  
looks like being one of the  
best programs you're likely to  
see on your Dragon this side  
of Christmas, and maybe even  
the other side as well. Pro-  
grammer John Humphreys de-  
serves all credit for squeezing  
more into the Dragon than  
you'd have thought possible,  
and the game is it'll be an  
even bigger seller than the  
company's earlier successes.

Mike Goward



## Dark Star

**Programs:** Dark Star Design  
Design, 110 Broadway Road  
Manchester NH 03101  
Phone: 603-886-1000

**FROM THE** people who brought you *Monopoly's* *Be-Range* and (when, where?) *Taboo*, *Army* comes quite simply the best O G game for the Oregon area — you guess what — *Monopoly's* *Be-Range*!

Dark Star puts the planet in the role of Luke Skywalker. Captain Starbuck (Buck Fudger) or any other space hero from *Orb* who to Han Solo (Tony Danza) trying through space, doing *Massacre* in the planet to look for and destroy everything else. It runs that George Lucas would be interested.

[illegible]

The game is very simple (in fact so simple that it could become boring after a while) but seems to have an indirect, literary, subjective quality that makes me want to keep playing for about an hour and then go off to bed.

There are enough options to set up a guard for every day in the year, and they can easily cater for any player's level of expertise. You can choose to use one of two puppeted characters or set the quest key to a humanoid ally.

Fig. 10 shows the difficulty level type of writing content and other options and have been discussed.

The game's controls are 3-D and are gracefully flowing. The practice is simple but fondly obvious and the speed at which they moved seems to have been offed on the smoothness and clarity of screen action. The panel is depicted simply and effectively and the feeling of being and doing is quite superbly galloping.

The guard is a man I have given I love them. It probably only deserved four and a half, but I'm not sure of it.

Steffelty had served as Design Director here, and she and the Design Team continue to support our brand with quality customer service.

**Journal of Management Education**



## Trekboer

Southwest: Prolester Mountain 41 Truss Road 98400  
Austin, Colorado

A NEW graphics gem is gliding the hearts of Dragon-advancers: coming as it does from the same studio which produced *Shogakukan's Sea Quest*, *Black Samurai*, and *Chango* (and, in case you'd forgotten those you've steered should you feel the adventure is a bit tedious), *Samurai* is the first true

The screen layout is sleeker and to those who like it, so is the style of the graphics with their occasional moving and zooming and lighting lights. — Flickering in the same format you're about to be with Trektronics — a sleeker look to the 21st century when the screen is illuminated by a steady glow. All you have to do is search the known universe if you're found a new, big galaxy.

First loop on is the central room with a couple of buffers to press a plaque and a wire sensor to lock it and a ladder to climb up. Moving down there is a teleporter room, fluid storage room, communications room and environmental control room. There's also a patch black room, which I've never yet figured out how to maneuver, and a few possibly useful objects. After a certain number of moves, a message comes through from the Control telling you the plaque is still simple. Go back to the empty room, wait there a second, go back to the ventilation shafting for three seconds and then go between co-ordinates and start.

Setting the controls for EDD brought up a panel on the rear screen. Head also was a little tricky, but after being spilled into space a few times, I finally worked out how to not blow

Once the player's surface is set, it's not hard to see that the graphics here are even more impressive. Your view of the player scrolls across the graphic window and after a little searching, I found the switched viewport, a virtual copy of the ship. I'd just left, except that everything is faded and empty — though the switched pitch (back view) is

I don't want to give too much time but something here should show you a way of visiting a frozen planet, and then you might learn something to help you find your way to a beautiful garden planet. Though not as beautiful as it might sound as it plunged to my death here trying to cross a bridge that wouldn't bear my weight. Pretty but not as beautiful as returning to earth. I'm again, which I haven't yet tried to do.

The adventure articles move by opening up and let you sometimes always have to leave something behind that you're sure you'll need to go back to. A convincing story and some nice details and I have an even better effort than its credible predecessors. I can see the question in the adventure volume straight.

1000



## Ready Eddy?

**Programs:** Eddie Steady-Ged  
Innovative Software, 54 London  
Street, Haysling RG1 4SD  
Berkshire RG1 4SD

**TIME FOR another case!** This game is all the usual edgy tunes for football coaches.



with another five thousand  
that you've never heard of  
[cause I've made them up]  
so I haven't bothered to print  
them

This is a deceptively simple concept that adds a lot to Mirror Mirror (surprise), but has been successfully distilled into something less complex. Believe it or not, excellent and accurate.

The safety rules that Flanagan finally accepted for the vacation included limits just on Black Beach. The guy didn't want to go through a safety lecture every time that the beach was patrolled. Flanagan said he'd

There are three controls (left, right and — you guessed it — jump) and the aim of each screen is simply to get Eddie from one side of the screen to the other — no lives, just a coin.

To stop him, we throw lures frogs give over air and they are usually (although not always) coming from the other side of the screen. It owes a lot to Marchonchi—especially the look of the entry stage.

The thing that sets the game up above its brothers is just its casualty: the ease with which players can design. The approach really do get progressively more difficult with players that appear easily fatigued in which of course, have a much greater side you being a better of with it simply provide running and jumping but with a special effect that makes them

Two hardy pluggers playing Edley Stanley (left) aren't getting a lot of love. There are 32 centers in the 1991 number 17 list, progress has become slow in comparison with the early 1980s. One of the most notable things about it is the way that individual people (and different centers) stay (or move) more freely to another man's other theory or something like that.)

It plays through at the normal speed and then when all 20 screens are complete it plays again at medium speed and then fast.

The sound is more like vaguely slithering but then also and then the perfect game that would be too much to ask. This is a very short track.

1. **Introduction** — what you want to do

**Figure 1**



Show?

Program: Showjumping Cont.  
 Outcomes: PD Box 318  
 Sources: Text 578-612  
 Price: \$3.95

A PGR one has never really had much interest in showing getting probably due to its blind fear of horses! However I'm in rather a bit of a predicament as I do not know what to do. I would be able to tell the difference as I usually follow the example of show-jumping and organised eventing of 10 and it shows appropriate examples of show-jumping and Campdrafting (Show-jumping).

Years ago in pubes there was a real little game called *Shut the Box*. What you had to do was have a table little graphed with 9 AngelBurger (see recipe) and 9 ones.

In this game, you control a cute little Princess Anna as she fights over various jumps. The jumps have gone the game is now more complex. So, here's a jump button.

This game has been badly dumbed [and anyway the "Home" could just as easily be a stunt bike with the quality of *Johnny*]. That is not to say it's a bad game. It's just not some of the prospective market. I mean surely something like *Speedy Street Man* would not have more than *Show* won't?

Thus credit is the first lesson in creative marketing. I'd love to be able to go on to say that the game itself was a relatively modest new challenge. Of all another literature-based event.

Show jump consists of a horse jumping fences of various lengths and heights spaced over several lines on the screen (the horse goes left to right on the top line, then the second, and so on to the end of the round). The obstacles are obstacles designed to jump. Basically you want a lot of speed for the long jumps, and very little for the short ones. Good luck!

There are new courses which would be more of those late trip and variations between them other than slightly later and longer jumps more frequently on the later courses.

The game has a jump-off option for two flying competitors which I was fortunate enough never to require. All in all it does seem to be a well written and thought-out program.

I'm sad that this game is so  
I look old ugly word  
about boring I just don't  
make the word be loud I'm  
suffering from the length grab  
continues

10. *Journal of the American Medical Association*, 2000; 284: 2689-2695.



and  $\gamma \in \Gamma$ . Whenever I have a request for data the kernel required is displayed at the top of the screen.

For quickly locating entries a "shortform" of the name is entered for each record. For example, for Fred Smith one might use SM-F. This shortform is also used by the program for sorting the records into alphabetical order before output.

Requests for information are signalled by a flashing cursor exposed when <> brackets. System prompts such as Press any key appear on the bottom line of the screen as do any error messages generated. Pressing the down arrow key with shift produces a list of help information at the bottom of the screen which puts you on important information in the manual. Pressing shift up arrow returns you to the main menu and it also lets the operator select. Surely the think key has been classified as the on/off.

Once you have entered your data it can (if necessary), be edited by searching the records from the main menu. Records are selected by entering the Shortname of the name. The program will attempt to find the nearest match for you if you mistype the word (e.g. "Student"). For example if you want to add the record of a fish (Smith) that swam together for the first time you might enter "SM" to the short name. When a match is found you can then accept it by **o** or scroll forward or backwards through the list.

This method of retrieving records is also used for the new *Declar* and *Print* options. When printing is selected the program can make use of another field that can be entered for each record the "Simulation" field. This is the *Declar-Print* part of a letter print. This procedure always prints *Declar*, so it is only necessary to enter the *Print* part in the simulation list.

A final option in the *MailMerge* menu is *Mail Merge Report*. This program lists the results and runs another program (such as the *AddressList* disk) used for most of the printing options. The *Final* program allows address labels to be printed the user sets the horizontal and vertical labels for the particular use of labels being used.

Most of the Report Program options depend on selecting attributes of records using selective tests on the field or user-defined fields. It is possible to select certain names, towns and regions using the wild card character asterisk (\*). The testing on user fields is possibly more useful. The tests available are: `is-occupation`, and `is-  
as`. For example, if a file contains a user-defined field number 12, which is coded `Occupation`, you could select only the records where occupation is "Programmer" by the following test: `12 = PROGRAMMER`.

In addition to "F", "Other" and "Off" is allowed several levels can be combined for very powerful selection of particular records. The other main option of the Report Program is to display or print selected fields from selected records in the form of a report with automatic isolating of numeric fields.

There are two other programs on the Windows chat, "MAIL PURGE" and "MAIL MERGE." The former allows selected e-mails to be deleted at bulk from a file, and the latter allows different files to be merged together. Neither of these two programs uses the 32-bit system screen which allows to launch the professional feel of the software. I would suggest that these two programs need either further writers to get the software

Herb's is undoubtedly the best Name & Address Management program I have seen running under DragonEdit. The screen display is excellent, the keyboard has a variable scan speed, and the help messages make the program very user-friendly.

The manual is also very well written with useful examples with its many powerful selection options and user-defined fields. This program is ideal for a small business which needs a tidy simple customer records or a club or society. This price is also well about right for a software of this type. Have a response to do send with Andrew.

Not perhaps one for the Christmas stocking, though— unless your loved one is in retail business!

[illegible]

## Mailbox software

**Program:** Master, Health  
Care Software 40 Alexander  
Road, Hingham, MA  
02043

| Age Group | Total (%) | Male (%) | Female (%) | Unknown (%) |
|-----------|-----------|----------|------------|-------------|
| 18-24     | 12.5      | 11.8     | 13.2       | 12.0        |
| 25-34     | 28.3      | 27.5     | 29.1       | 28.0        |
| 35-44     | 22.1      | 21.5     | 22.8       | 22.0        |
| 45-54     | 18.7      | 18.2     | 19.3       | 18.5        |
| 55-64     | 14.2      | 13.8     | 14.6       | 14.0        |
| 65+       | 5.2       | 5.1      | 5.4        | 5.0         |

MAILPOINT is a new name and address database program for the Dragon 32 and 64 with DragonDOS from Hans-Martin Grottel, the company that produces the Moneybox program.

As with *InfoSystem* (also version), *MailBox* uses *Harbor*'s custom 40x24 screen and keyboard driver which produces a very clear and pleasant display including full screen color and so on. *MailBox* can handle up to 99 separate files and can also handle *MAILBOX* to *MAILBOX* or variable length files (such like ordinary records of names and addresses) and goes up to 100 user defined fields.

Figure 1. (a) Schematic diagram of the experimental setup. (b) Schematic diagram of the experimental setup.

BI driver, and has extensive input/output checking. The first thing to do is to select the **CMOS/BIOS** file option. Information can be set for the size of the file and the number of user-defined fields is required for the program to then create the empty file on a data disk. Another always assumes that you only have a single disk drive, so prompts are output to swap programs and data disks when prompted.

The idea behind user defined fields is that you can store extra information such as occupation or age about each person on the list. These user defined fields are given names and format by another option from the main menu. Three formats are available:

Alpine Academy reserves the right to alter the program. Please bring names only and Date means only dates will be accepted if the children do

NEW

# SHOW-JUMP

NEW



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Linkword seems to be an excellent program with much enjoyment to be had from it.

*Dragon User May 85*



## BLOCKBUSTER QUIZ

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- Shape-filled prints
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## C SAVE

I HAVE been trying to write a program which has to read in a program that has been saved by CSAVE.

When I save a program the way I always get an 80 error at the beginning of the first block of information when loading it back in.

This means I cannot load or read the last block, is this a common fault or have I got a problem with the computer?

C Technician  
Preston  
Devon



80 PSET (X Y PC) NEXT X & Y  
100 GOTO 100

10 SET PC

999 P1 9999  
910 P2 9999

JUST STORE the Dragoncode rather than a RTI.

It is not necessary to call an interrupt when a program; the routine will automatically be executed every 100th of a second temporarily at the time. If you want to use interrupts which are called from the program you should use Software Interrupts initiated by the RTI instruction. The address of the interrupt routine should be stored in registers 240-249 and the routine should end with a RTI. The 240 instruction automatically clears all registers and the RTI automatically restores them.

THE following program reads in a program previously saved with the CSAVE. A command line by file. This could be used as part of a custom editor for example. You should not get 80 errors with this program; if you do then the most obvious fault is your cassette deck, or less likely the computer itself.

```
10 OPEN "F" :—
20 IF EOF (-1) THEN 60
30 LINE INPUT A:—1 AS
40 PRINT A
50 GOTO 20
60 CLOSE :PRINT "END OF FILE"
```

## P POINT

COULD you please write a small program demonstrating PPPOINT and how to use it. The change isn't a lot of help as it doesn't actually give a very good example.

I am a complete beginner and am trying to learn myself programming.

Leeds Page

THE PPPOINT command seems to use the same technique that is used in graphical environments. Its purpose is to return the colour at the start of the specified polygon. The program below should demonstrate this by changing any given points to blue and any red to yellow on every other line.

```
10 PPOINT 1,1 PCLS SCREEN 10
20 COLOR 4:LINE (10,10)-(10,90):PSET BP
30 LINE (10,90)-(250,170):PSET BP
40 For Y=0 TO 160 STEP 4
50 For X=0 TO 255 Step 2
60 G=PPPOINT (X,Y)
70 IF G=4 THEN PC=2
80 IF G=8 THEN PC=3
```

## Variable pick up?

I'VE been working on a machine code routine that needs to pick up specially reserved variables in a program. I am looking for a way to look through the Basic variable table and interpreting the byte floating point number to an integer, pass it to the machine code table.

Something is not right, as all the variables return the same number from the first variable name — to in the short program example below.

```
10 GOS
20 FOR P1=0 TO 512
30 FOR P2=0 TO 256
40 EVALUATE (P1,P2)
50 NEXT P2
60 NEXT P1
```

The variable P2 returns the same value as P1.

Maybe the Dragon has been my main source, especially the Number Representation section, but I need more help.

Richard Prosser  
Oxleyton, Surrey CR0 3JN

THE simplest way of manipulating a relative stack on this is to use the BASIC command with parameters. For example the BASIC command could be written as a routine at address 30000 which could be called as:

```
80 GOS 30000 P1 P2
The first part of the routine would read as follows:
10 GOS 30000
20 FOR 30000: GOS 30000
30 FOR 30000: GOS 30000
40 GOS 30000
50 FOR 30000: GOS 30000
60 FOR 30000: GOS 30000
```

## Beeb data

IS it possible to transfer data from a BBC computer to the Dragon 64? I wish to use a large amount of data and so cannot transfer it directly into the Dragon. I have a disk drive and the BBC data is on disk.

Peter Searns  
Middx  
Worcester

THE BBC disk format is not directly compatible with the Dragon disk system. The easiest method of transferring data is to use an ASCII link. The Dragon's CLOAD command could be used but the world does writing code on the BBC to send data in a standard Dragon file format. A simpler solution would be to write a small program on both computers to send and receive the data on a character by character basis, saving the data in disk on the Dragon so it is received using PPPOINT.

## Interrupts

I HAVE recently been trying to understand the use of interrupts and how these are initiated in a program. My intention is to have applications to games programming.

C Technician  
Preston

THE START address of an interrupt routine is placed in registers 240-249 and the routine must end with a JMP #2555 (or

## Structure

I AM attempting to design my Dragon files.

I would be grateful if you could help me determine some of the problems I have encountered.

How does the Dragon manage such expressions as (A-B) OR (A-B)?

How do I store and use CLOAD, CLOAD and CPRINT?

Kevin Coward

THE Dragon, in common with most Macs, evaluates most before expressions, such as (A-B) as (A-B) and not (A-B) as (A-B). In fact, the Dragon will allow any size data value to supply a true value.

For details of the Dragon 64's routines see Dragon User Data set 1995. The evaluator's routines give details of the value of the following number in the Basic 2 registers respectively. The info pointer used in the 'Data Pointer' at address 194-197 which should point to the first character of the expression.

## Dancing

WHICH keyboard are affected by the interrupt from the cassette player? I want to write a basic program which will dance to the music entered from the tape.

A. A. Sholin

THE ONLY hardware feature affected by the cassette input port is PPPOINT — bit 9. By changing bit 9 a number of times in a loop, it is possible to change the frequency of the sound output in which can be used with a simple program such as you describe.

| Year | Population | Population | Population | Population | Population |
|------|------------|------------|------------|------------|------------|
| 1990 | 100        | 100        | 100        | 100        | 100        |
| 1995 | 100        | 100        | 100        | 100        | 100        |
| 2000 | 100        | 100        | 100        | 100        | 100        |
| 2005 | 100        | 100        | 100        | 100        | 100        |
| 2010 | 100        | 100        | 100        | 100        | 100        |
| 2015 | 100        | 100        | 100        | 100        | 100        |
| 2020 | 100        | 100        | 100        | 100        | 100        |
| 2025 | 100        | 100        | 100        | 100        | 100        |
| 2030 | 100        | 100        | 100        | 100        | 100        |
| 2035 | 100        | 100        | 100        | 100        | 100        |
| 2040 | 100        | 100        | 100        | 100        | 100        |
| 2045 | 100        | 100        | 100        | 100        | 100        |
| 2050 | 100        | 100        | 100        | 100        | 100        |
| 2055 | 100        | 100        | 100        | 100        | 100        |
| 2060 | 100        | 100        | 100        | 100        | 100        |
| 2065 | 100        | 100        | 100        | 100        | 100        |
| 2070 | 100        | 100        | 100        | 100        | 100        |
| 2075 | 100        | 100        | 100        | 100        | 100        |
| 2080 | 100        | 100        | 100        | 100        | 100        |
| 2085 | 100        | 100        | 100        | 100        | 100        |
| 2090 | 100        | 100        | 100        | 100        | 100        |
| 2095 | 100        | 100        | 100        | 100        | 100        |
| 2100 | 100        | 100        | 100        | 100        | 100        |



CHALLENGE is coming, the game is getting hot, and no doubt if you put a few pennies into *Adventure*, there'll be a hot story for you to enjoy, to enjoy you with your share of Scott Adams' adventures. The *Yuletide*. Which you choose is up to you, but whichever it is, I doubt if you'll be disappointed with the challenge of a Scott Adams title. The two'll be looking at the month have very distinct scenarios. *Pinus Adventure* should seriously cater to the parents amongst our readers, while *Woodoo Castle* should cater to... well, we won't go into that.

*Pinus Adventure* is actually the second in the lengthy Adams series and was in fact written by Scott jointly with his wife Alexis. Scott's first adventure, *Adventureland* (reviewed last month), already seemed so hard to get your head round that it's safe to say that *Pinus* will be one part of the master disk of the game. It's the fairly easy. Fortunately for us concerned about it, turn the oven on, and obviously it didn't take long for her to be taken by the advent as dug herself. For her first attempt at outwitting she chose a desert island setting, though the opening location seems to be fairly hard-drain being a flat in London. A hard-drain drive as Arthur Dacey might call it. At first it looks just like any ordinary flat, with a pair of sneakers lying on the floor, a bag, a

stretched bottle of bottles, a sack of crackers, a sack of crackers? No doubt there'll be a puzzle lurking somewhere. And with the sign on the wall? Being serious here, any Scott?

#### Nailed

Taking what I could (the rag proved to be nailed to the floor) I went upstairs to the stairs, in which there was a bookcase, in which there was a book, in which there was a word written in blood on the floor. (The book sounds suspiciously like a mirror want to see. The book itself is between Scott and another message informs you that Luring James later left two treasures there, which must be hidden in Robert's Lower Dimension but let's not quibble. There are a couple more locations in the flat, if you can find them, and then it's out or in a window ledge, provided you've done something to prevent yourself falling to the pavement far below.

Do everything right and you might find yourself on a sandy beach on some tropical isle. Resisting the temptation to grab the towel, rub it in the desert ocean and badly offend with the latest *Jetset* Archer paperback, I examined the horizon and found that surely the sea was out. I went boldly into the horizon, found an indecipherable rocky shore, went north and promptly staggered that I was out, out of the game and in: "Never never land" from where every direction takes you nowhere. You can equally stagger from a Scott Adams death, but seemingly not to one. I rechecked and had the sense to explore the island before venturing into the horizon again, well it's a good job I did, although I didn't think so while I was wandering around the maze of caves.

Apart from *Never never land*, *Pinus Adventure* had only 22 locations, and if you think that's small then *Woodoo Castle* is limited to only 22. With very little by way of land, you could probably fit those adventures into an unexpanded ZX81, minus even a pocket calculator, but with Scott Adams it's the puzzle, the matter and a well told, yet a goodly while to uncover those puzzling locations, because the

*Woodoo Castle* is written solely by Alexis Adams and dedicated to all Mom! The month among our readers will be about how it's a good reason for buying it, while those with more might find it would make an excellent Christmas present. What

you think about it? Adventure? All the more reason, that. But of your mom, hope the game is a slight with nothing but a stolen, stolen, but company. Nothing, but life at the table we use the major words. (DREAM CORP) and discovered a million people but a sign saying "Good. Good's a term, correct? There's one way for him to live! Find it, and he'll go free! What can it all mean? And what about the man wearing the supplies rag? Is he dead or alive? Who came, gave that thing home, it's bound to come in useful somewhere.

Heading north I walked into a room where the window slammed shut instantly and wouldn't open again. I left that problem for later and headed south which brought me to a dingy-looking street and a dangerous with an open cell. It didn't seem a good idea to open the cell, but I pocketed the puzzle pieces that was lying about and went instead into the lower chamber. I couldn't get through the big door that requires a key of magic, but did get into the every which contained a sword and equal of armor. On for a bit of armor, this being an American adventure. (Slightly, you could MOVE ARMOR, but nothing happened when you did.

#### Witch's brew

Next I needed my way past a room full of animal heads, another room with a pair of witch's bone, and finally was a lab containing several interesting items. There was a juju bag, which I naturally tried to get to match up with the juju man statue. I'd already found. No dice. It was stuck to the floor. There were some animal bones, though using these only prevented one of them to explode periodically and eventually kill me. There was also some stashed chemicals, I was informed, on examining them (that they appeared to be useless. Is this a good move? Maybe not. By the time I found a small tunnel leading to a slippery white floor, the mother room the exploding bones had got me what a painful leap to go.

For all her first food and few locations, I think any adventurer worthy of the name ought to try tackling these ideas from the Adams family.

Phil Gaskell of *Begin* (it has been lying a few Scott Adams effort, his adventures in the new, such as a word of *Seduction*, and has kindly sent in a few clues for the benefit of other readers.



**IT'S ON  
AGAIN!**

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# Cat and mouse!

*A game for four to six year olds from Steve Gathercole*

THE IDEA of the game is to teach four to six year old children the alphabet and the position of the keys on the keyboard. When run, the game displays two little houses, one for a cat, and one for the mouse. A letter is presented in the middle of the screen and the child must press that key if the key is not pressed quickly enough at the whizz key, a picture of the cat will start to catch the mouse. The idea is to get home before the cat catches you up! The alphabet is displayed in order and

there are three levels of difficulty. More or less should try this first at level one - but be careful, you could show yourself up!

**ARRAYS** — B1 = bank M0 = mouse down MJ1 = mouse up MJ4 = mouse right ML = mouse left CR = cat right CL = cat left HQ = house

**VARIABLES** — C1 = cat's position, C2 = cat's position, MY = mouse's position, MX = mouse's position  
**FILES** 00 — 340 picture graphics to screen

and sets up array

**FILES** 350 — 440 data for the graphics  
**FILES** 450 — 480 data and routine for drawing letters on the high res screen  
**FILES** 490 — 495 sets up and displays introduction screen  
**FILES** 500 — 1000 main loop  
**FILES** 1010 — 1030 subroutine for cat and mouse movement and check for end of screen (optional)  
**FILES** 1040 — 1060 bank free save  
**FILE** 1060 (bank switch)

## PROLOGUE

```

10 REM MOUSE
20 REM FOR 4 TO 6 YEAR OLDS
30 CLS:PRINT@,"CAT AND MOUSE":
40 PRINT:PRINT"*****
*****"
50 PRINT:PRINT:PRINT:PRINT" AN A
LPHABET TEACHING GAME":
60 PRINT:PRINT:PRINT" FOR THE
VERY YOUNG...
70 PRINT:PRINT:PRINT:PRINT:PRINT:P
RINT:PRINT" HAND ON A MINUTE"
80 PPOKE 3,1:CLS
90 DIM OL(15),MD(15),MU(15),MR(15)
:ML(15),CR(15),CL(15),HQ(15)
100 DIM L$@320
110 GOTO 200
120 A=1536
130 FOR B=0 TO 2
140 FOR N=1 TO 24
150 READ S:PPOKE A+B,S
160 A=A+32
170 NEXT N
180 A=1536:NEXT B
190 RETURN
200 PCLS:GOSUB 120
210 GET @,M1=(324,24),MD,B
220 PCLS:GET @,M1=(324,24),OL,B:GOS
UB 120
230 GET @,M1=(324,24),MU,G
240 PCLS:GOSUB 120
250 GET @,M1=(324,24),CR,G
260 PCLS:GOSUB 120
270 GET @,M1=(324,24),MD,G
280 PCLS:GOSUB 120
290 GET @,M1=(324,24),CL,G
300 PCLS:GOSUB 120
310 GET @,M1=(324,24),MR,G
320 PCLS:GOSUB 120
330 GET @,M1=(324,24),ML,G
340 PCLS
350 DATA @,0,0,0,0,0,0,1,5,5,5,5,5,1
,1,5,5,5,1,1,1,0,0,0,0,0
360 DATA @,16,16,16,64,64,0,64,64
,64,64,0,0,64,64,64,192,0,0,0,0
,0,0
370 DATA @,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0
380 DATA @,0,0,0,0,1,1,5,5,5,5,5,1,1
,5,5,5,5,1,0,0,0,1,5,0,0,0,0,0,0
,120,64,64,64,64,0,0,64,64,64,64,64,6
4,0,64,64,64,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
390 DATA @,0,0,64,64,16,4,4,4,4,4,
17,64,64,64,64,64,64,64,64,16,5
,5,0,16,20,20,16,16,160,0,36,140,0
5,0,5,5,0,4,64,1,1,1,1,04,65,65,0,
16,60,60,16,16,160,120,96,0,0,64
,64,0,0,0,0,0,0,0,0,64,64
400 DATA @,0,0,0,1,4,16,60,16,16,16,
16,16,16,16,16,16,16,16,16,16,16,1
6,16,21,20,20,0,0,0,0,0,0,0,5,4,4,
5,0,0,0,0,0,0,65,65,65,65,65,65,0
,0,0,64,16,4,65,4,60,60,60,60,4,4,
4,4,4,4,4,4,4,4,4,4
410 DATA @,4,5,4,4,4,4,2,9,32,0,0
,1,1,0,0,0,0,0,0,0,0,1,1,0,4,20,20
,4,4,4,4,32,24,70,65,0,60,60,0,16,2
1,64,64,64,64,21,65,65,0,0,0,1,5,4
,16,16,16,16,16,60,17,21,5,1,1,1,1
,1,1,4,60,60
420 DATA 16,65,65,65,70,21,1,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0
430 DATA @,64,64,64,147,161,60,64,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
440 DATA 64,60,60,65,65,64,60,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
450 DATA 1,5,37,65,65,1,5,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,5,21,65,
64,65,5,21,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,4,65,61,61,145,64,64,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
460 FOR K=0 TO 24:READ L$:GOTO NEXT
470 FOR K=0 TO 9:READ H$:GOTO NEXT

```

```

400 DATA B2,ND4R3D2HL3H2B2C2,ND4R
3D4HL2FD4HL3D4H2R2,ND3D4R3B4H2R2,ND
4R2FD2SL2D2C4R,ND3D2R2D2D2D4H2R2
490 DATA ND3D2R2D2D2C4R,ND3D4R3D2
L2B2D2R,D4R3D2HL2D2R2,ND4H2R2,D4R
D2SL2R2D2R2,D2H2D2HF2D2D2R2
500 DATA D4R3D4H2R2,ND4FR2H2B4H2R2,H
D4FR3D4H2R2,ND3D4R2D4H2R2,ND4R3D2HL2
B2C2,ND3D4R3B4H2R2
510 DATA ND4R3D2L2FD2H4H2R2,ND4R3D2
L2D2R2D2R2,ND4H2R2,D4R2D4H2R2,D3FR
D2R2,D4FR4H2R2
520 DATA DFD2BL2D2C4H2R2,DFD2D2H2R2
,R3D3D2R3D4H2R2
530 DATA ND3D4R2D4H2R2,D2DND4H2R2,R2
D2L2D2R2D4H2R2,ND2D2D2R2D2D2R2D4H2R2
,D2R2D2D4H2R2,ND3D2R2D2L2B2D4,D4R3D2
L2D2D2R2,D2H2D4H2R2,ND3D4R2D2HL2D2D2R
2,ND3D2R2D2D4H2R2
540 GOTO 620
550 DRAW"DR"+STR$ D2D "+",+STR$(YY)
560 FOR K=1 TO LEN D4D
570 B$=MID$(D4,K,1)
580 IF B$="E" AND B4="R" THEN DR
$=H$+M$+D4K>1:GOTO 610
590 IF B$=" " THEN N=0 ELSE N=ASC I
B$1-B$
600 DRAW L$+D$
610 NEXT
620 RETURN
630 POLS3"SCREEN 1:0
640 X0=99:Y0=39:AS="CR1":DRAW"C2SL
6":GOSUB 550
650 X0=100:Y0=79:AS="AND":DRAW"C2S
8":GOSUB 550
660 X0=75:Y0=150:AS="HOUSE":DRAW"C
2S16":GOSUB 550
670 FOR T=1 TO 4
680 PLAY"OLT"FOR N=1 TO 4:PLAY"TZS
500CF$ABD+1":NEXT N
690 NEXT T
700 FOR T=0 TO 200:NEXT T
710 POLS3
720 X0=39:Y0=39:AS="LEVEL":DRAW"C2
516":GOSUB 550
730 SOUND 50,5:X0=39:Y0=79:AS="LEV
EL":DRAW"C2S16":GOSUB 550
740 SOUND 100,5:X0=39:Y0=150:AS="L
EVEL":GOSUB 550
750 SOUND 150,5
760 X0=200:Y0=39:AS="1":DRAW"C2S16
":GOSUB 550:SOUND 100,3
770 X0=200:Y0=79:AS="2":DRAW"C2S16
":GOSUB 550:SOUND 100,2
780 X0=200:Y0=150:AS="3":DRAW"C2S1
6":GOSUB 550:SOUND 100,3
790 D$=DKEY$
800 IF D$="1" THEN W=39:CY=12:CX=1
2:HY=12:HX=12:GOTO 840
810 IF D$="2" THEN W=120:HY=12:HX=
12:CY=12:CH=2:GOTO 840
820 IF D$="3" THEN W=200:CH=24:CY=
24:HY=24:HC=24:GOTO 840
830 GOTO 790
840 POL$=PUT (0,0)-(24,24),H0,PSET
850 PUT (100,0)-(120,24),H0,PSET
860 LINE (100,72)-(100,187),PSET,0
870 HC=10:YC=30
880 H$=170:V$=30
890 REM=====IN LOOP
900 PUT (10,30)-(34,54),CR,PSET
910 PUT (170,30)-(180,54),HS,PSET
920 FOR N=1 TO 24
930 B$="ABCDEFGHIJKLMNPQRSTUVWXYZ
"
940 AS=MID$(B$,N,1)
950 X0=120:Y0=62:DRAW"C2S16":GOSUB
550
960 FOR Z=0 TO W
970 Z=INKEY$
980 IF Z=AS THEN GOSUB 1200:GOTO
1010
990 IF Z<>AS AND Z<>" " THEN GOSUB
0:1070
1000 NEXT Z
1010 GOSUB 1070
1020 X0=120:Y0=62:DRAW"C2S16":GOSUB
0:550
1030 IF X0=XC AND Y0=YC THEN 1500
1040 IF X0<170 AND X0>130 AND Y0<3
0 THEN 1530
1050 NEXT N
1060 GOTO 920
1070 IF X0=XC AND Y0=YC THEN 1500
1080 IF X0<100 AND Y0<30 THEN GOTO
1120
1090 IF X0>=100 AND Y0>=30 AND Y0<
140 THEN GOTO 1170
1100 IF X0>=100 OR X0>=60 AND Y0
=140 THEN GOTO 1210
1110 IF X0<=60 AND Y0>=140 OR Y0=
30 THEN GOTO 1200
1120 REM RIGHT
1130 PUT (XC,YC)-(XC+24,YC+24),BL,P
SET
1140 XC=X0+CX
1150 PUT (XC,YC)-(XC+24,YC+24),CR,0
R
1160 RETURN
1170 REM DOWN
1180 PUT (XC,YC)-(XC+24,YC+24),BL,P
SET
1190 Y0=Y0+CY:PUT (XC,YC)-(XC+24,YC
+24),CR,CR
1200 RETURN
1210 REM BACK LEFT
1220 PUT (XC,YC)-(XC+24,YC+24),BL,P
SET
1230 XC=X0-CX:PUT (XC,YC)-(XC+24,YC
+24),CL,CR
1240 RETURN
1250 REM UP LEFT
1260 PUT (XC,YC)-(XC+24,YC+24),BL,P
SET
1270 Y0=Y0-CY:PUT (XC,YC)-(XC+24,YC

```

MOVE OVER POLE POSITION HERE.

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## MICRODEAL





# The Dragon's Claw

*Roy Coates looks at an interesting new development in Dragon peripherals*

THE DRAGON'S CLAW is one of the many hardware add-ons that should have appeared a couple of years ago. It is fast, faster than the Dragon may have enjoyed, a far more interesting and experienced user base than it currently does.

The Claw is a standard sized cartridge which has three sockets protruding from it. There are two on the top of the cartridge the first being an eight-bit Centronics I/O port, and the second being an emulation of the BBC computer User Port. The third connector is something that should be found on a lot more of the add-ons on the market. It is simply an extension of the Dragon's cartridge port which allows another cartridge such as another Claw or a disk interface to remain connected to the Dragon whilst the Claw is in use. With this in mind, the Claw has been designed in such a way that it may be redesigned to make it one of four different places within the Dragon's address space. Although none of these addresses are known to conflict with those used by other cartridge add-ons, it does mean that up to four Claws may be controlled together!

## Heart

The heart of the Dragon's Claw is the tried and tested Rockwell 6522 Versatile Interface Adapter (VIA). This is a very clever device which may be set up to handle just about any type of I/O that may be required. As evidenced in the Claw manual, it would take many reams of paper to attempt to list all of the possible applications of the 6522 VIA, and so a brief description of the device will have to



The Dragon's Claw—Are sure it will prove to be a success!

suffice. The 6522 contains 18 eight-bit registers, and these are individually addressable through four address lines on the chip. Address decoding is provided within the cartridge to allow the placing of the cartridge at the four different address areas as mentioned above.

The documentation that is supplied with the Claw consists of the now standard Address booklet and contains a description of the Claw along with a programming example and the Data sheet for the VIA chip.

With the software to support it, the Claw may be used to drive all the wonderful peripherals that have appeared for the

BBC, more such as the PermaPlot plotter, Robot arms and the Grid Carters produced from Programming. The Claw to interface to other devices does require a basic knowledge of interfacing, but an example is provided and would give a good starting point for someone interested in this often fascinating field of computing.

The Claw Cartridge is surprisingly small, fitting in a plastic case measuring only 3" x 2" x 1" and is fixed with a small detachable handle. A taped mounting bush has thoughtfully been provided so though it will require a longer than average mounting hole in the back it compensates for the size. A length of ribbon cable about 60 feet long is used to connect the owners to the Dragon's Claw and the plug is a very tight fit against the side of the Dragon. Although Lockite assure you that this is intentional, I must admit to being a little wary when moving the camera about in case the cable should snag on something and pull the cartridge out. It didn't and I was not prepared to see how hard you had to pull to tend out!

The demonstration software provided with the camera is an example although restrictions are given for saving this to disk. The program consists of a BASIC program and two machine code programs. A source listing of the machine code is given in the manual with descriptions of all the routines and how to implement them in your own programs.

Having loaded the software, the cable is worked straight away and I was a little surprised at seeing myself appear on the



computer screen (if you have seen "Iron" you will understand why). The demo program is in three parts: the first part will display a picture as seen by the camera and will calculate an average exposure to build up the image on the screen. The second part of the program allows you to alter the exposure time manually which often gives a lot more scope to the final picture quality, and the final part of the demo performs a colour enhancement of the last exposure as used in many scientific applications to enhance certain areas of the picture.

Having quickly experimented with varying subjects, it was found that the camera has a particularly narrow field of vision and is best using objects no more than about four feet away. Strong lighting tends to bleach the image thus losing a lot of the detail. The light from a normal 60 watt domestic bulb was found to be about the best source of light. The quality of the picture suffered visibly, noticeably depending on the content, items which have a great deal of contrast such as a metal paper or a cartoon appear far more clearly than would a coloured object. As mentioned in the camera manual, the Optical Read is particularly sensitive to the colour red and so anything that is red tends to come out as if it was pure white.

#### Beastie

Lucinda Baw, already released her SharpDragon camera with software to drive the unit through the Dragon's Claw



Portrait of the author as a computer screen

and now have a Beasty robot arm working happily. They will be demonstrated this at the forthcoming 8809 show. Future devices may include some of the turtles available for the 8800 micro and possibly a home satellite weather station. Obviously this will depend on the market response to this product, but the Claw is

the key that opens up so many doors as far as add-ons go that I am sure that it will prove to be a success.

Over the next few months I shall be trying the Claw with a commercial robot arm, and I shall also be trying some of the suggested applications for the camera in the camera manual. Watch this space!



## of the hill!

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# Competition Corner

Answers to Competition Corner,  
Dragon issue, 12-13-14 Magazine  
Street, London WC2H 7PP

**THE (GREAT) AT HOME** is one of the oldest games for two players, and certainly a lot of variations can be found in most countries and cultures. Here is a game that can be played using the longest of materials such as pebbles (on the beach or come on the table). It can also be adapted for playing by computer.

The rules of the game are simple. Several pebbles are laid out in a number of rows and players take it in turns to remove one or more pebbles. The only restriction is that of each go the players must all come from the same row. The winner is the player to take the last pebble.

For example in the game below a player could remove either one, two, three, or four pebbles from row A, or either one of both pebbles from row B, or he might want to remove four and all seven pebbles from row C.

```
A * * * * *
B * *
C * * * * *
```

In fact, the only rule would be to take just one pebble from row C. Unfortunately, space (almost) cannot afford enough us to say that should be so, but readers who are interested might get some clue from analysing the program given below and seeing how the computer decides on its best move. That this method is related to the binary method of counting might suggest why the game of Nim is suited to computer analysis. Indeed a machine called the Perfection was built by the Westinghouse Electric Corporation and exhibited at New York in 1940. This machine weighed a ton and was limited to playing with only four rows with a maximum of seven pebbles in each. The version for the Dragon given here adds variety to the game by generating a random number of rows with up to 26 pebbles in each row. You will find that as the computer plays out the pebbles, each block of five is in a different colour. This too is significant relating to the game and is done simply to make counting the pebbles in each row easier.

Have a Happy Christmas!

For the Christmas Competition we are leaving to the advantage of the well-known anthropologist and explorer Mr. Synopsys. Officer-Fingert who has just returned from the remote East European country of Pandomonia.

This country is so remote that the conventional numeric system of numbers is not unknown. Instead of using the 10-digits which we recognise as 0-9 to nine, the Pandomonians use 12 written symbols which bear a striking resemblance to our letters A B C D E F G H I and J.

(though not necessarily in this order)

Not surprisingly books of mathematical tables are in vogue in the local shops and the D-4, making one for an English Pandomonian phrase book, would be a great deal of confusion by noting from a page of square numbers. This is perhaps understandable if it is realised that amongst the table of squares in the edition of Pandomonia are the words **HAD CHAIRAGE** and **DORED**.

Can you determine which letter represents which digit?

```

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```

**Price**  
THIS MONTH we have a special prize one of the latest and perhaps best games for the Dragon. Micro-robots have kindly agreed to donate 20 copies of *Proktor*, their latest graphic adventure — said if you want to find out just how good it is, turn to the reviews pages where Mike Germond gives it the once over.

**Rules**  
No little copy of *Proktor* you must first show the answer to the above problem, and, secondly, demonstrate how you solved it with the use of a Basic program written on your Dragon.  
Please do not send in a cassette

containing your entries

Make sure your name and address is printed clearly on your entry and mark the envelope Competition Envelope which do not say which month you are entering will be disqualified.

As a tie-breaker, complete the following sentence in 10 words or less.  
I want to visit a Dark Star because

Entries must reach Dragon issue by the 1st working day in December. The winners will be announced in the March 1988 issue. The editor's decision is final and no correspondence will be entered into.  
WRONG! IF WINNER cannot be reached at —

every month people win prizes! And September was no different!

The following eleven 15 have managed to get themselves copies of both *Charlie Egg* and *downloading* Absolute from Art P. Software. They are: Richard Byrne of Gloucestershire, Elna, Peter Cutting of Putney, & Norman of Addlestone, D Medora of Scarborough, M. Sheridan of Stoke Newington, Karen Money of Harlow, & Lillian of Arterbury, S. Hall of Bolton-in-Sandwich, C. Jones of Llanerdd, Lulu Matthews of Sea View, Spalding, S. Hall of Kettlewell, Kevin Desmond of Cork, the Old Fella Wilson of Culterston, Marjory Rachel Edwards of Bridgeton, and Ruth Haskin of Rugby.

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